114-523

TRANSCRIPT OF RECORD.

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1884.

No. 224.

THE BEECHER MANUFACTURING COMPANY,
APPELLANT,

vs.

THE ATWATER MANUFACTURING COMPANY, ROBERT R. MILLER, AND J. B. SAVAGE.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE DISTRICT OF CONNECTICUT.

FILED JUNE 16, 1882.

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a In the Circuit Court of the United States for the District of Connecticut. In Equity.

THE ATWATER M'F'G CO. *et al. v.* THE BEECHER M'F'G CO.

And now, to wit, April 27th, 1882, the said defendant, The Beecher Manufacturing Company, by Hector T. Fenton, its counsel, comes into court, and prays for allowance of an appeal to the Supreme Court of the United States from the final decree of the court in above-entitled cause, which appeal is allowed, and bond ordered to be filed in the penal sum of forty-five hundred dollars.

N. SHIPMAN,
District Judge.

b Know all men by these presents that we, The Beecher Manufacturing Company, a corporation organized under the laws of the State of Connecticut, and located at Southington, in said State, by H. D. Bassett, pres't of said company, thereto duly authorized, as principal, and D. F. Southwick, of Meriden, New Haven county, and State of Connecticut, and H. D. Bassett, of said Meriden, as sureties, are firmly held and bound unto The Atwater Manufacturing Company, a corporation organized under the laws of the State of Connecticut, and doing business at Southington, in said State, and Robert R. Miller and J. B. Savage, complainants in the suit hereinafter mentioned, in the sum of forty-five hundred dollars, to the payment of which we bind ourselves, our heirs, and executors. Witness our hands and seals, at New Haven, Connecticut, this 27th day of April, A. D. 1882.

The condition of this bond is such that whereas the said The Beecher Manufacturing Company have appealed from the
c final judgment and decree of the circuit court of the United States, in and for the district of Connecticut, lately made and entered in the case of the said complainants against The Beecher Manufacturing Company aforesaid, defendants therein, to the Supreme Court of the United States, to be held at Washington on the second Monday in October, 1882: Now, if the said obligors shall cause the record of the said appealed cause to be duly entered in said Supreme Court on or before said opening day, and shall duly cause an appearance to be made therein for said defendants to prosecute the same, and shall answer all costs and damages to the said complainants in case they shall fail to prosecute said appeal to effect and make their plea good therein, then this bond shall be valid and binding in law; otherwise, to be void and of no effect.

THE BEECHER MANUFACTURING CO.,
By H. D. BASSETT, *Pres't.* [SEAL.]
D. F. SOUTHWICK. [SEAL.]
H. D. BASSETT, [SEAL.]

The foregoing bond is approved.

N. SHIPMAN,
District Judge.

d

THE ATWATER MANUFACTURING COMPANY *et al.*

v.

THE BEECHER MANUFACTURING COMPANY.

Be it remembered that on the 19th day of August, A. D. 1879, there was filed in court a bill in equity, in the words and figures following, viz:

1 United States Circuit Court, District of Connecticut. In Equity.

THE ATWATER MANUFACTURING COMPANY, JULIUS B. SAVAGE, and ROBERT R. MILLER

vs.

THE BEECHER MANUFACTURING COMPANY.

To the judges of the circuit court of the United States for the district of Connecticut:

The Atwater Manufacturing Company, a corporation duly established under the laws of the State of Connecticut, Julius B. Savage, and Robert R. Miller, of the county of Hartford, in the State of Connecticut, and in the district of Connecticut, bring this their bill of complaint against The Beecher Manufacturing Company, a corporation duly established under the laws of the State of Connecticut and located at West Meriden, in the county of New Haven, State of Connecticut, and district of Connecticut.

And therefore your orators complain and say:

That Robert R. Miller aforesaid was the original and first inventor of certain new and useful improvements in dies for

2 forming the heads of king bolts, fully described in letters patent hereinafter mentioned, and which had not been known or used before his said invention, and which had not been at the time of his application for patent, as hereinafter mentioned, in public use or on sale with his consent or allowance, for more than two years prior to the application aforesaid.

And your orators further show that the said Robert R. Miller, being the first and original inventor of said improvements in dies for forming the heads of king bolts, and being a citizen of the United States, did, on the 22d day of February, 1870, upon due application therefor, and by complying with each and all of the provisions of the acts of Congress in such case made and provided, procure letters patent of the United States, signed by the Secretary of the Interior, and countersigned by the Commissioner of Patents, and bearing date the day and year last aforesaid, to be issued to the said Robert R. Miller and Julius B. Savage, whereby there was granted and secured unto the said parties, their heirs, administrators or assigns for the term of seventeen years from the said 22d day of February, 1870, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvements, a description whereof is given in the specification annexed to the said letters patent, as by said letters patent, or a duly authenticated copy thereof in court to be produced, will fully and at large appear.

And your orators further show unto your honors that afterward the said Robert R. Miller, for a valuable consideration to him in hand paid, did, by an assignment in writing, sell, assign, transfer,
3 and make over to the said Atwater Manufacturing Company all his right, title, and interest in and to the said letters patent and to the invention and improvements therein described and claimed, which said assignment bearing date the seventh day of March, 1870, and was duly recorded in Liber S[12], page 245, records of transfers in the United States Patent Office, according to the provisions of the several acts of Congress in such cases made and provided, as by said assignment, or a duly authenticated copy thereof, in court to be produced, will fully and at large appear.

And your orators further show unto your honors that afterwards, to wit, on the 21st day of February, 1879, the said Atwater Manufacturing Company and Julius B. Savage, being at that time the lawful and only owners of the letters patent and invention aforesaid, and for a valuable consideration to them paid therefor, did, by an assignment in writing, bearing date the day and year last aforesaid, sell, assign, and transfer to themselves and the said Robert R. Miller, all their right, title, and interest in, to, and for the said letters patent, and to the invention and improvements therein set forth and claimed, which said last mentioned assignment was afterwards duly recorded in Liber O[23], page 351, records of transfers in the United States Patent Office, as by law required; as by said assignment, or a duly authenticated copy thereof, in court to be produced, will fully and at large appear.

And your orators further show to your honors that the said Atwater Manufacturing Company, Julius B. Savage, and Robert R. Miller, did, on the 6th day of May, 1869, upon due application there-
for, and by complying with each and all of the provisions of
4 the acts of Congress in such cases made and provided, procure reissued letters patent of the United States, signed by the Secretary of the Interior, and countersigned by the Commissioner of Patents, and bearing date the day and year last aforesaid, to be issued to the said Atwater Manufacturing Company, Julius B. Savage, and Robert R. Miller whereby there was granted unto the said parties, their heirs, administrators, and assigns for the remainder of the term of seventeen years from the said 22d day of February, 1870, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used the said improvements, a description whereof is given in the specification annexed to the said letters patent, as by said letters patent, or a duly authenticated copy thereof, in court to be produced, will fully and at large appear.

And your orators further show unto your honors that by virtue of the said letters patent and assignments hereinbefore recited, your orators became, and now are, the owners of the said letters patent, and all the rights and privileges granted and secured, and intended to be granted and secured thereby, and that they have employed the said invention in their business as manufacturers of carriage hardware, to their great benefit and advantage, and that the public has to a great extent, and almost universally acknowledged and acqui-

essed in the rights of your orators, and that your orators will receive large gains and profits from the said invention, by reason of the premises aforesaid, if infringements by the defendants and others shall be prevented.

That the said invention is of great value to your orators, to wit, the value of fifty thousand dollars.

Yet the defendant, well knowing the premises and the right secured to your orators as aforesaid, but combining to injure
5 your orators, and to deprive them of the benefits and advantages which might, and otherwise would, accrue unto them from said invention, did, in the town of West Meriden, in the county of New Haven, in the State of Connecticut, on the 6th day of May, 1879, and on divers days since, as your orators are informed and believe, without the license or consent of your orators, and in violation of their rights and in infringement of said letters patent hereinbefore recited, unlawfully and wrongfully make and use dies embracing in their construction and mode of operation the said inventions and improvements, the exclusive right of which is vested in your orators by virtue of said letters patent hereinbefore recited and the several assignments herein set forth, and that the defendant is threatening to make and use such dies, to the effect of depriving your orators of sales of king bolts manufactured by them, and of the benefits and advantages of the said letters patent.

And your orators further show that the dies which the defendant is using embrace in their construction and mode of operation substantially the same inventions and improvements as those embraced in the dies made and used by your orators under and by virtue of said letters patent.

And your orators further show that they have caused notice to be given to the said defendant of said infringement and of the rights of your orators in the premises, and have requested it to desist and refrain therefrom, but it has disregarded said notice and refused to desist from such infringement, and still continues to make and use dies, in disregard of the rights of your orators under said letters patent.

And your orators further show that the aforesaid acts of
6 the defendant are to the great loss of your orators, by which they have been, and still are, deprived of great profits which they might and otherwise would have obtained, but which have been and are received by said defendant by and through its unlawful acts as aforesaid; and your orators pray a discovery of how many and what dies the defendant has made and used, and of the profits arising to said defendant therefrom.

And for as much as your orators are utterly remediless at the common law, and can have no relief except in this court:

To the end, therefore, that the said defendant may, if he can, show why your orators should not have the relief prayed for, and may upon its corporal oath, and according to its best and utmost knowledge, remembrance, information, and belief, full, true, direct, and perfect answers make to the premises, and to all the several matters hereinbefore stated and charged, as fully and particularly

as if interrogated as to each and every one of such matters, and may be compelled to account for and pay to your orators the profits it acquired and the damages suffered by your orators from the aforesaid unlawful acts—

May it please your honors to grant unto your orators the writ of injunction issuing out of and under the seal of this honorable court in due form of law, commanding, enjoining, and restraining the said defendant and its servants, agents, attorneys, and workmen, and each and every of them, from directly or indirectly making, using, or vending to others to be used, or in any manner counterfeiting or imitating the said inventions or any part thereof, or any dies made in accordance therewith. And, also, may it please your honors to grant unto your orators the writ of subpœna issuing out of
7 and under the seal of this honorable court, directed to the said defendant, commanding it by a certain day, and under a certain penalty, to be and appear in this honorable court, then and there to answer the premises, and to stand to and abide such order and decree as may be made against it, and to grant to your orators such other and further relief as shall be agreeable to equity and to the honorable court shall seem fit.

And your orators, as in duty bound, will ever pray, &c.

THE ATWATER M'F'G CO.,
By M. N. WOODRUFF, *Pres't.*
J. B. SAVAGE.
R. R. MILLER.

GEO. S. PRINDLE,
Solicitor and Counsel for Complainants.

UNITED STATES OF AMERICA, }
State of Connecticut, County of Hartford, } *ss:*

Merritt N. Woodruff, president of the Atwater Manufacturing Company, Julius B. Savage, and Robert R. Miller, being duly sworn, severally depose and say that they have read the foregoing complaint, know the contents thereof, and are acquainted with the facts; that the same is true to their own knowledge, except as to those matters stated on information and belief, and as to those matters they believe it to be true.

Before me—
[SEAL.]

M. H. HOLCOMB,
Notary Public.

8 [SEAL.] The President of the United States of America to the marshal of the district of Connecticut, sendeth greeting:

You are hereby commanded to summon The Beecher Manufacturing Company, a corporation duly established under the laws of the State of Connecticut, and located at West Meriden, in the county of New Haven, in the State and district of Connecticut, to appear before the judges of the circuit court of the United States of America for the district of Connecticut, in the second circuit, in

equity, on the first Monday of October, 1879, wheresoever the said court shall then be, to answer a bill of complaint exhibited against said The Beecher Manufacturing Company in said court by the Atwater Manufacturing Company, a corporation duly established under the laws of the State of Connecticut, Julius B. Savage and Robert R. Miller, of the county of Hartford, in the State and district of Connecticut, and then and there to answer the same, and to do and abide by what said court may order and decree in the premises.

Make due service and return at least twenty days before said first Monday of October, 1879.

Witness the Hon. Morrison R. Waite, Chief Justice of the Supreme Court of the United States, at Hartford, this 19th day of August, A. D. 1879.

E. E. MARVIN, *Clerk.*

The defendant is required to enter its appearance in said cause in the clerk's office of said court on or before the day at which this writ is returnable, or, by the rules of said court, said bill will be taken as confessed.

E. E. MARVIN, *Clerk.*

C. R. INGERSOLL,
New Haven, Conn., Complainants' Solicitor.

8½ UNITED STATES OF AMERICA, }
District of Connecticut, New Haven County, } ss:

MERIDEN, *August 19th*, 1879.

Then and there I served the within writ on The Beecher Manufacturing Company herein named by leaving at the usual place of abode of D. F. Southwick, the secretary of said corporation, a true and attested copy hereof. Said copy was delivered to a woman who said she was the wife of the said Southwick, but she refused to give me her name.

Attest:

JOS. D. BATES,
U. S. Marshal.

Fees:

Service	2.00.
Copy & end	1.00.
Team	.50.
Travel	2.40.
	15.90.

9 And on the same day George S. Prindle, M. H. Holcomb, and C. R. Ingersoll entered their appearance for the complainant, and on the 4th day of October, 1879, H. T. Fenton, Esq., entered his appearance for the defendant, and on the 3d day of November, 1879, defendant's answer was filed in the words and figures following, viz:

10 United States Circuit Court, District of Connecticut, sitting in Equity.

THE ATWATER M'F'G CO. *et al. vs.* THE BEECHER M'F'G CO.

The answer of The Beecher Manufacturing Company, defendant, to the bill of complaint of The Atwater Manufacturing Company, Julius B. Savage and Robert R. Miller, complainants.

These defendants, now and at all times hereafter, saving and reserving to themselves all and all manner of benefit or advantages of exception or otherwise, that can or may be had or taken to the many errors, uncertainties, and other imperfections in the complainant's said bill of complaint contained, for answer thereunto, or unto so much and such parts thereof as they are advised is or are material or necessary to be answered unto by these defendants, answering, say:

1. These defendants, answering upon information and belief, admit that letters patent of the United States No. 100,053, dated Feb. 22, 1870, for an alleged improvement in series of dies for forming the heads of king bolts, were granted to Robert R. Miller and J. B. Savage as assignees of said Robert R. Miller, as in said
11 bill of complaint alleged and set forth; but defendants have no knowledge of the alleged assignments of the said letters patent to the said complainants as in said bill averred, or of the title of the said complainants to the alleged reissue of said original patent, and pray that the complainants may be required to make due proof thereof.

2. And these defendants, further answering, say that they are informed and believe it to be true, as in said bill alleged, that the said original letters patent were surrendered to the Commissioner of Patents, and new letters patent, No. 8694, dated May 6, 1879, issued to the said complainants therefor, but defendants are advised and believe, and so charge that said last-mentioned letters patent were absolutely null and void from their issue, and that the same were improvidently, wrongfully, and illegally granted, inasmuch as said reissued letters patent describe and claim an alleged invention that is distinct from and dissimilar to and not the same as the alleged invention described and claimed in said original letters patent; and that new matter was interpolated into said reissued letters patent in contravention of law, which said new matter embraced certain important and substantial changes and alterations which had become known and used by the public, and which were extensively used as public property, and did not belong to or have any part in the alleged invention of the said Robert R. Miller, and which were in express terms disclaimed in said original patent; and these deponents further aver, upon information and belief, that said original letters patent were not surrendered because the same were inoperative by reason of a defective specification, the error having arisen by accident and mistake, without any fraudulent or deceptive
12 intention on the part of the said Miller, but that the same were fully operative and valid for all the intents and purposes that

the said Miller pretended or designed that they should be, without any defective speculation or accident or mistake; that the said surrender was made, and the said reissued letters patent obtained by the said complainants with the fraudulent and deceptive intention of comprising and embracing in said reissued letters patent the important and substantial changes and alterations hereinabove mentioned or referred to, and which had no part in the said alleged invention of said Miller; by reason of which said fraudulent and deceptive intention the said reissued letters patent were and are null and void.

3. And these defendants, for further answer to the said bill, say that they are informed and believe that the said alleged improvement described and claimed in the said letters patent, or the material and substantial parts of the thing patented, had been for more than two years prior to the application for said original letters patent in public use and on sale, by and with the consent and knowledge of the [said] Robert R. Miller, by reason whereof the said original and reissued letters patent were and are null and void; and they further say, in denial of the relief in said bill prayed, that they are advised and believe, and so charge, that the said letters patent do not describe or claim any patentable subject-matter of invention embraced within the act of Congress relating thereto, wherefore the said original, as well as the said reissued letters patent, were wrongfully and improvidently granted, and were and are void, and [of] no force or effect

4. And these defendants, further answering, deny that they
13 have ever at any time made, sold, or used, or intend to make, sell, or use the alleged improvement, or any substantial and material [part] thereof, described and attempted to be claimed by the said complainants in the said reissued letters patent, or that they have violated or infringed any exclusive privileges validly secured to said complainants by said letters patent, or either of them; and these defendants further say that for several years last past they have, in the course of their business as manufacturers of carriage hardware, made and sold large numbers of king bolts for carriages, most of which were formed into shape by means of dies, but which said dies were and are substantially different in every material respect from the improvement described and claimed in the said reissued letters patent in that the defendants do not use any die corresponding to the metal block B in said patent, having grooves *b* and *b'*, constructed as therein mentioned, nor any plane-faced upper die C, nor do defendants use any die corresponding to the block D in said patent mentioned, provided with a U-shaped cavity and the recesses and grooves in said patent described; and furthermore, the series of dies used by defendants, being five in number in the series, all substantially different from the dies described and claimed in said reissued patent, form a king bolt that in many of its parts differs in shape and form from the king bolt figures 3 and 4, shown in the drawings of and constructed and shaped by the dies claimed in and by the reissued letters patent in the bill mentioned.

5. And these respondents, further answering, say that they are informed and believe, and so charge, that the said Robert R.

Miller, in said bill named, was not the true, original, and
14 first inventor of the alleged improvement, or any material and substantial part thereof, described and claimed in and by said letters patent; but that the said alleged improvement, or the material and substantial part thereof, claimed as new and original, had been, long prior to the alleged invention or discovery thereof by said Miller, and prior to his application for said original letters patent therefor, described in various printed publications and letters patent, and was then known to, and had been publicly made, used, and sold by, divers persons in the United States and elsewhere; and among the letters patent in which the same is found described is letters patent of the United States No. 96251, granted to F. B. Morse, dated Oct. 26, 1869; and among the persons to whom the same was so known, and by whom the same was so made, used, and sold, are F. B. Morse, now or late residing at Plantsville, Connecticut, who so made, used, and sold the same at said Plantsville and elsewhere; also Josiah Wilcox, now or late residing at Portchester, New York, who so knew of and made and used the same at said Portchester and elsewhere; also E. D. Clapp, now or late residing at Auburn, State of New York, who so knew of and made and used the same at said Auburn and elsewhere; also H. D. Smith and John B. Smith, both now or late residing at Plantsville aforesaid, and Wm. B. McElney, now or late residing at Meriden, Conn., all three of whom so knew of and made and used the same at the factory of H. D. Smith & Co., at said Plantsville and elsewhere; also Wilson W. Knowles, now or late residing at Plantsville aforesaid, who so knew of and made and used the same at said Plantsville and elsewhere.

15 Without this, that there is any other matter, cause, or thing in the said complainants' said bill of complaint contained material or necessary for these defendants to make answer unto, and not herein and hereby well and sufficiently answered, confessed, traversed, and avoided, or denied, is true, to the knowledge or belief of these defendants; all which matters and things these defendants are ready and willing to aver, maintain, and prove, as this honorable court shall direct, and humbly pray to be hence dismissed with their reasonable costs and charges in this behalf most wrongfully sustained.

H. T. FENTON,
Solicitor for Defendant.

DISTRICT OF CONNECTICUT, *ss:*

D. F. Southwick, secretary of the Beecher Manufacturing Company, defendant, being duly sworn, says: That the facts set forth in the foregoing answer, so far as stated of his own knowledge, are true, and so far as stated on information, he verily believes them to be true.

D. F. SOUTHWICK.

Sworn and subscribed before me, this 3d day of November, 1879.
[SEAL.] E. E. MARVIN,
U. S. Com'r.

16 And on the 29th day of November, 1879, complainant's replication to defendant's answer was filed in the words and figures following, viz:

In the Circuit Court of the United States for the Second Circuit, in the District of Connecticut.

ATWATER MANUFACTURING COMPANY
v.
THE BEECHER MANUFACTURING COMPANY. } In Equity.

The replication of The Atwater Manufacturing Company, complainant, to the answer of The Beecher Manufacturing Company, defendant.

This repliant, saving and reserving unto himself, now at all times hereafter, all and all manner of benefit and advantage of exception which may be had or taken to the manifold insufficiencies of the said answer, for replication thereunto says that it will aver, maintain, and prove the said bill of complaint of this repliant to be true, certain, and sufficient in law to be answered unto, and that
17 the said answer of the said defendant is uncertain, untrue, and insufficient to be replied unto by this repliant without this, that any other matter or thing whatsoever in the said answer contained, material or effectual in the law to be replied unto, and not herein and hereby well and sufficiently replied unto, confessed, or avoided, traversed, or denied, is true.

All which matters and things this repliant is and will be ready to aver, maintain, and prove, as this honorable court shall direct, and humbly prays as in and by said bill he has already prayed.

C. R. INGERSOLL,
Solicitor for Complainant.

And on the 11th day of June complainant's evidence was filed in the words and figures following, viz:

18 Circuit Court of the United States, District of Connecticut.

THE ATWATER MANUFACTURING COMPANY *et al.*
vs.
THE BEECHER MANUFACTURING COMPANY. } In Equity.

Proofs taken on behalf of complainants under and pursuant to the 67th rule of the Supreme Court of the United States, in equity, as amended, before Francis G. Ingersoll, notary public for the State of Connecticut, and at the city of New Haven, pursuant to notice, and with the same effect as if taken before an examiner, by consent of parties.

Present: Geo. S. Prindle, Esq., and C. R. Ingersoll, Esq., counsel for complainant, and H. T. Fenton, Esq., counsel for defendant.

Complainants offer in evidence office copies, certification waived, letters patent U. S. reissue No. 8694, dated May 6, 1879, issued to Robert R. Miller, assignor to himself, J. B. Savage, and Atwater

Manufacturing Co., for improvement in series of dies for forming the heads of king bolts, and marked Complainants' Exhibit A.

Mr. Fenton objects to the offer of the reissued patent unless
19 it is to be followed by an offer of the original patent, together with all the assignments of the same.

SAMUEL JARVIS, a witness produced by and on behalf of the complainants, being duly cautioned and sworn, answers to questions propounded by C. R. INGERSOLL, Esq., as follows:

1st Int. What is your name, age, residence, and occupation?

Ans. Samuel Jarvis; Southington, Conn.; machinist and die sinker; 34.

2d Int. Were you ever in the employ of the Beecher Manufacturing Co., the defendant; and, if so, when and in what capacity?

Ans. Yes, sir; I have been employed by the Beecher Manufacturing Co. I went to work for them in March, 1877, and I continued to work for them until November 4, 1879. My business then was in making dies and doing general repairing; looked after the engine once in a while.

3d Int. During that time, and when you left their employment, were they engaged in the manufacture of clip king bolts?

Ans. They were making what they called a plain king bolt. I didn't hear them call it a clip king bolt.

They said that they were making one in Southington that they couldn't make; they called it a flange king bolt.

4th Int. Describe the king bolt which they were making.

Ans. The king bolt that they were making when I left them was what they called a plain king bolt. In form the upper portion was of a V shape which extended from below the V shape a sound shank; on this shank a collar was formed.

5th Int. In what respect did it differ from the flange king bolt which you have referred to as being make in Southington?

20 Ans. The only difference between the plain king bolt and the one called the flange king bolt—at the base of this V shape there was a protruding or a lip projecting on each side; in all other respects it was identically the same.

6th Int. Which of these bolts had the lip you referred to, the flange or the plain?

Ans. The flange.

7th Int. Were those king bolts which were made by the defendant formed by dies or not?

Ans. They were made by dies.

8th Int. Did you ever, while with the defendant, make any dies for the manufacture of such bolts? If so, describe the dies and the several operations by which they were used.

Ans. While in their employ I made part of these dies for bolts. It wasn't my especial duty to make those special dies altogether. The die is a solid cast iron—the impressions in these dies for the clip were partially cast in, there being no hole in the center. Being a solid die, this hole had to be drilled and reamed, and the impression for the clip sometimes, if this was not of sufficient depth, had

to be worked out or made deeper to correspond to the size required. The form of those dies that they were using when I was there, the upper portion or top, where this impression is sunk, is of a circular form—the bottom or base similar to any other die for holding it in the bed of the drop. In making these king bolt blanks a round piece of iron of a given length is split a certain given distance from the end or top; this piece of iron that is split is taken and put into these dies, where the impression of the king bolt is made while hot, which is under a drop, and the foundation of this king bolt
21 is made by the drop falling on it. It is taken from this die while still hot and put into a pair of trimmers in the trimming press, which gives it the form required; it is taken from the trimmers and put into what we call the benders, which gives it the form of the letter U or V—more of the V shape, the letter V. When in that state it is called a blank, and then it is reheated and put under dies which draw the shank down, that being large, to the required shape. That completes the operation.

9th Int. Refer to the drawings of complainants' reissued patent "Exhibit A," and state if you find there—and, if so, designate it—any representation of the first blank used in the operation which you have described; I mean the blank first to be subjected to the action of the die.

Ans. Fig. 1 represents the first blank.

10th Int. Referring to the same drawing, do you find there anything showing the shape to which the blank was brought after the operation of the first die, to which you have referred?

Ans. Fig. 2 shows it, with the exception of the depression in the center; in all other respects it is like it.

11th Int. Do you also find there—and, if so, designate it—anything to show the shape to which it was brought by the action of what you call the benders?

Ans. Fig. 3 shows the exact form that it has after coming out of the benders.

12th Int. Referring to the same drawings, do you find anything in them to show the impression of the dies by which the blank was brought into the shape indicated by Fig. 2?

Ans. Fig. 5 in the lower die has the same impression, with the exception of this transverse depression; in all other respects
22 they are identically the same, except this in the drawing is a square die, and the other one was a round die. The upper die was an oblong, flat at each end, having a bulge or projection to correspond with the depression in the lower die. The upper die represented in the drawing has a plain surface; in all other respects they are similar.

13th Int. Look at the model now shown to you, and marked Complainants' Exhibit B and C, and state whether or not it correctly represents the defendant's dies, to which you have referred in your last answer?

Ans. This die represented as "C" is the lower die; the impression in this die is like (objected to as irresponsive) the die proper which they were using, when I was in their employ. Die "B," or

upper die, is a perfect *fac-simile* that they were using when I was with them.

14th Int. Referring again to the drawings of the reissued patent, state whether or not you find there anything to illustrate the shape and operation of the dies in use by defendants, and which you have called "benders?"

Ans. Fig. 6 shows an exact representation of their benders.

15th Int. What was the object of the transverse impression in the first mentioned dies, to which you have referred?

Ans. It was to give it a better shape, and to have it bend easier.

16th Int. How soon after you went into the defendant's employ did you see dies for the manufacture of king bolts, such as you have described?

Ans. They were among the first dies I saw after going there.

23 17th Int. And did they continue to be used by them while you remained there?

Ans. They did.

Cross-examination:

18th X Ques. Are you at present in the employ of the Atwater Company and James B. Savage, two of the plaintiffs in this case, or either of them?

Ans. I am in the employ of James B. Savage.

19th X Ques. Does he, in the course of his business, manufacture clip king bolts by means of dies?

Ans. He does.

20th X Int. In such manufacture, does he use the dies or any of them shown in the drawings of the plaintiffs' reissued patent?

Ans. He does.

21st X Int. All of them?

Ans. Yes.

22d X Int. Does he use the die, Fig. 5, precisely as shown in that drawing?

Ans. With the exception of the depression in the lower (transverse depression) and in the upper die of a projection, but like the models B and C.

23d X Int. By the expression transverse depression, in referring to Fig. 5, did you mean that part of the drawing marked *b?*

Ans. No, sir; but this transverse impression running across, or partially across, is not shown in the drawing.

24th X Int. If I understand you correctly, in the lower die now used by the plaintiff, J. B. Savage, the transverse depression runs completely across the block. Is that so?

24 Ans. It does, like model C.

25th X Int. Do you mean to be understood as saying that the dies shown by the models B and C are similar in construction and operation to the dies B and C in Fig. 5, in the re-issued patent?

Ans. Their operation is identically the same. There is a difference in formation with B and C, the difference being that depres-

sion in the lower die and that extension in the upper. In other respects they are the same.

26th X Int. In the die, Fig. 5, do you not find a transverse depression marked *b*, made expressly to form the lips or flanges, as shown in Fig. 4?

Ans. This lower die of Fig. 5, marked *b*, is not what I would call a transverse depression, but in model Exhibit C, is what I would call a transverse depression. Fig. *b*, in the lower die, is simply a rounding back and beveling off, which would form a lip.

27th X Int. If you placed a piece of hot iron between the dies B and C, Fig. 5, would not the resulting king bolt necessarily have two transverse protecting lips or flanges *a'*, shown in Fig. 4?

Ans. They would.

28th X Int. If you placed a piece of hot iron between the dies "Exhibit B and C," would not the resultant king bolt necessarily be a plain clip bolt, such as you have testified was made by the defendant, when you were in his employ?

Ans. It would make both plain and flange.

29th X Int. Would it make both at the same time, or which would it make without alteration, in its present condition?

25 Ans. It would make both providing there was stock enough in the split blank. A plain king bolt can be made from the blank of the flange king bolt, split blank.

30th X Int. Did you ever know the defendant to make a flange king bolt, such as shown in Fig. 4 of the patent?

(Objected to the question, as it assumes that both be a flange king bolt.)

Ans. The king bolt that they were making, when I was there, was in all respects identical with this represented in Fig. 4, with the exception of the flange or lip extending from the side, not as far as represented in the drawing. What they called a plain king bolt, in other respects identically the same.

31st X Int. Do you mean to say that the defendant's king bolts had any lips or flanges, or that the plaintiffs' king bolts had flanges not so large as the drawing?

Ans. The king bolts manufactured by the defendants were not as wide in the lip as represented in the drawing. The plaintiffs' king bolts were both flanged and plain. The flange represented in the drawing better than the plain.

32d X Int. Do you mean to say that the defendants made any king bolts with lips or flanges?

Ans. The king bolt that they manufactured with a lip or flange was between the plain and the flanged king bolt manufactured by the plaintiff. That is to say, that the plain king bolt that the plaintiff manufactures is a king bolt narrower than that manufactured by the defendant.

33d X. Int. The counsel asks the witness to answer yes or no.

26 Ans. No, they never manufactured, strictly speaking, flange king bolts.

34th X Int. Has not J. B. Savage used the dies "Ex. B and C"

since shortly after you went into his employ and continued to use them instead of the dies shown in Fig. 5 of the drawing?

Ans. He has (blocks "Ex. B and C.")

35th X Int. When you stated in answer to the third direct int., "that they were making one in Southington," who did you refer to as making the bolts in Southington?

Ans. J. B. Savage.

36th X Int. How many separate pairs of dies did the defendants use in making the king bolts while you were in their employ?

Ans. Five. In making the bolt complete I include the benders and trimmers and the finishing dies.

37th X Int. Did they use the five in forming the bolt?

Ans. No; they did not.

38th X Int. How many, and which, were used in forming the bolt?

Ans. Three; designated as the welding, trimming and bending.

39th X Int. Does J. B. Savage use, or has he used to your knowledge, any such dies or pair of dies shown in Fig. 6 of the reissued patent?

Ans. He does.

40th X Int. Please explain to me the operation of that pair of dies.

Ans. Fig. 2 represents the blank as it passes through the trimmers. The next operation it is placed centrally on the bot-
27 tom die *d*, in Fig. 6, and a motion transmitted through the upper die or plunger E, forms the king bolt as represented in Fig. 9.

41st X Int. Did you ever make while in the employ of the defendants a complete set of dies for the manufacture of king bolts?

Ans. I have made all with the exception of the bender, but I have repaired them all.

42d X Int. Will you please state particularly what function is performed by the bender in the formation of the bolt?

Ans. After the bolt is taken from the trimmer it is placed on the tops of the benders and the form of the bolt is given by the plunger coming down upon it.

43d X Int. Which of the dies do you call the bender in the plaintiffs' device shown in the reissued patent?

Ans. Fig. 6.

44th X Int. Does Fig. 9 truly show the condition of the bolt when struck in the die, Fig. 6?

Ans. It does.

45th X Int. How is the bolt taken from the die, Fig. 6, after it has been struck?

Ans. With a pair of tongs—pulled out.

46th X Int. Then the die, Fig. 6, is a solid block, *i. e.*, the lower portion of it—is that so?

Ans. Not necessarily.

47th X Ques. Is it not so in practice, as far as you are informed, and is it not in the drawing in the patent?

Ans. The drawing represents it solid, but they could be made as well not solid.

28 48th X Int. Did you ever see them made in any other way than solid at the plaintiff's establishment?

Ans. I have.

49th X Int. When?

Ans. When I was in his employ.

50th X Int. Give me the date as near as you can.

Ans. 5th November, 1879.

51st X Int. How is the lower part of the die, Fig. 6, now made at Mr. Savage's, in one solid block or in two parts?

Ans. When they are first used they are solid; after being used a length of time, in order to take up the wear, they are cut in two. The formation of both is the same as with solid die.

52d X Int. Who suggested to cut the die in two parts in Mr. Savage's place?

Ans. I do not know.

53d X Int. Did not you suggest it?

Ans. I did not. It was in use long before I went there.

54th X Int. How do you know that fact?

Ans. Because the remains of old dies lay around the shop.

55th X Int. Shortly after you entered the employ of Mr. Savage, did you not suggest in making new dies, Fig. 6, to make the lower die of that figure in two parts and insert the collar of the bolt from the side?

Ans. No, sir.

56th X Int. Do you not know that all dies for bending used by the defendant while you were in their employ were constructed in two parts and operated as described in the last question?

Ans. I do.

29 57th X Int. In Fig. 6 of the patent the shank of the bolt is inserted vertically into the lower die, is it not?

Ans. A king bolt after being taken from the trimmers and placed across the upper portion of the benders, the shank of the bolt lies vertically above the impression in the die. The upper die or plunger coming upon the king bolt forces it into the impression in the die.

58th X Int. That answer was founded on the assumption that "*d'*" in Fig. 6 represents the depression receiving the shank and not the depression receiving one of the clips, is that so?

Ans. Fig. "*d'*" receives the clip, but not the shank.

59th X Int. After the king bolt is subjected to the operation of the dies 5 and 6, is it not subjected to a further operation to form a collar below the clip?

Ans. It is.

60th X Int. Have you had any experience in the manufacture of king bolts by means of dies, or do you testify from your observation of the work of others in the foundry?

Ans. The only experience I have was while I was in the employ of the plaintiff and defendant.

61st X Int. And your principal duties in both places were in the

making and repairing the dies, and not in forging the bolts, is that so?

Ans. Yes, sir.

Redirect examination:

62d Rd. Int. You have said that in defendant's manufacture of king bolts five operations were necessary to complete the bolt; how many of those operations were used in forming the head and clip, or the other parts than the shank?

Ans. Three. Welding, trimming, and bending.

63d Rd. Int. What was the trimming operation?

Ans. After the bolt is taken from the welding dies, Fig. 5, it has a ragged outside edge and by passing through the trimming dies the required form is obtained.

64th Rd. Int. Do you mean any other form than results from trimming the ragged edge off?

Ans. No, sir.

65th Rd. Int. You have stated that after you went to Mr. Savage's you used welding dies with the transverse impression referred to; do you mean to be understood by anything you have testified in that connection that this was the first of his using such dies?

Ans. I do not.

66th Rd. Int. Did you or not find such dies in use by him when you went there?

Ans. I did.

Recross-examination:

67th Re-X Int. Do you mean, by your two last answers in your R'd examination, to testify that Mr. Savage used any dies in which a transverse impression ran all the way across, as in Ex. B and C, prior to the time when you went to work there?

Ans. Before going there I had been told, while working at the defendants, that the dies were the same as those that Mr. Savage used.

(Answer objected to as hearsay and question is repeated.)

31 Ans. I have seen king bolts that were made there while I was in the employ of the defendant, the same as some that had been purchased of J. B. Savage, with the exception of the lips. I did see, about a week before I went there, dies like Ex. B and C, at Southington, at Mr. Savage's place.

68th Re-X Int. Did the transverse impression run all the way across the block in those?

Ans. I did.

69th Re-X Int. How came you to see them?

Ans. I was in conversation with the person that forges the king bolt at Mr. Savage's.

70th Re-X Int. Did you go into the employ of Mr. Savage immediately after leaving the Beecher Company.

Ans. Yes, the day following.

SAMUEL JARVIS

Sworn to before me—

F. G. INGERSOLL,
Notary Public.

THOMAS C. HANCOCK, a witness produced by and on behalf of the complainants, being duly cautioned and sworn, answers to questions propounded by C. R. INGERSOLL, Esq., as follows:

71st Int. What is your name, age, residence, and occupation?

Ans. Thos. C. Hancock; 37; Birmingham, Conn.; blacksmith.

72d Int. Were you ever in the employ of the defendant, The Beecher Manufacturing Co., and, if so, during what period and what were your duties?

32 Ans. I was from 23d Oct., 1877, till the 20th Sept., 1879. I was in the forging shop at work on a hammer most of the time.

73d Int. Forging what?

Forging the stems to king bolts, double reach clips, and all the trip-hammer work for the first year that I was there.

74th Int. During your employment there, did they manufacture clip king bolts, and if so, how were the head clips formed?

Ans. They did. Made from round iron; cut in lengths; heated and put under a drop and split to form a clip blank. They were placed in a drop die to form the clip—they called it welding. I believe they were trimmed and bent up, the shanks were drawn then under a hammer.

75th Int. How were they bent up?

Ans. They were placed in a die, in a press, with a hole in it to receive the shank, a plunger came down and bent it.

76th Int. Look at reissued patent, "Complainant's Exhibit A," and state whether you find in its drawings any representation of a blank before it was subjected to the welding dies, and after it had gone through the welding dies and bending dies, and if so, designate such representations?

Ans. Fig. 1 represents the blank before it went to the welding die. Fig. 2 represents the blank after it went to the welding die and trimming die. Fig. 3 is the nearest of anything here to show the shape of it after it left the bending die.

77th Int. Look at the model, "Exhibit B and C," and state whether that model represents the impressions of the welding dies in use by the defendants during that time, in that manufacture?

Ans. There is a slight difference in the bottom die—no
33 material difference. I believe the corners on the transverse groove were a little sharper than their's—so near as my memory serves. I think the impression for the clip was wider in theirs than in this.

78th Int. Look again at the drawings of Exhibit A, and state whether Fig. 6 represents, with substantial correctness, the bending dies used by the defendant during that time in that manufactory?

Ans. They do.

79th Int. What was the object of the transverse impression in the welding dies?

Ans. It was to throw the stock on the side of the clip, on the side of the bolt shank.

80th Int. Why was it cut all the way across?

Ans. Because it was a cheaper way and quicker way to make the die.

81st Int. Had you ever seen such a construction of die for making the clips of king bolts before you went into the defendant's employ; if so, where?

Ans. I had. At the Atwater Manufacturing Co., Plantsville.

82d Int. During what period?

Ans. From April 5th, 1872, till about the 25th of June, 1877. I was in their employ during that time.

Cross-examination:

83d X Int. Which of the dies did you operate in the defendant's forge?

Ans. The drawing and finishing dies for drawing and finishing the shank.

34 84th X Int. Did you then see the forming and bending dies in operation?

Ans. I did.

85th X Int. Do you mean to say that from '72 to '77, while you were in the plaintiff's employ, the Atwater Company used a pair of forming dies in which the lower die had a transverse impression running all the way across the block, and the upper die a rib or projection to fit the lower die?

Ans. I do.

86th X Int. Did that die, so used by the Atwater Company, form a plain clip king bolt or one with flanges or lips, as shown in fig. 4 in the drawing?

Ans. Formed both.

87th X Int. Which did it form without alteration?

Ans. I think it formed them both without alteration. I think it was the same for both.

88th X Int. Will you please explain how the same pair of dies could form two differently constructed king bolts without alteration, from one pattern to the other?

Ans. There was more stock used for the flange king bolt, and consequently made it wider. The difference in the two king bolts, plain and flange, was made in the trimming die at the Atwater Manufacturing Company.

89th X Int. Look at fig. 5 of the patent drawing, and see if you ever saw in use anywhere a pair of dies like those shown?

Ans. I think I have seen a die like B, but never saw it used.

90th X Int. Where?

Ans. At Atwater Manufacturing Co.

91st X Int. Do you know the reason why they didn't use it?

35 Ans. Because they were using the one with a transverse groove.

92d X Int. Did you not hear them say that they would not use it because they could not make on it a satisfactory king bolt?

Ans. No.

93d X Int. Was not that the reason why they did not use it?

Ans. I don't know.

94th X Int. Is it your opinion that it could have been used to make a satisfactory king bolt?

Ans. I don't think you could make one like the one on the desk without alteration.

95th X Int. Is the one on the desk like the one the defendants were making?

Ans. Practically the same.

96th X Int. Please look carefully at the dies, fig. 5, in the patent, and the short transverse depression or recessed groove *b*, and say whether or not if a king bolt were forged in that forming die it would necessarily have lips or flanges as shown in figs. 3 and 4?

Ans. I don't think it would have as large a flange as represented in figs. 3 and 4.

97th X Int. Please look at figs. 6 and 9 of the patent, and state if the king bolt is inserted in that die before the collar is formed on it?

Ans. It is.

98th X Int. If the collar was first formed on it, would it not be impossible to insert the shank in the die, fig. 6, without making it in two parts, and altering the blocks accordingly?

36 Ans. It would, if you wanted to hold it tight.

99th X Int. Is not the bolt inserted in the die, Fig. 6, vertically?

Ans. Yes.

100th X Int. If you forged a collar on before subjecting a bolt to this die, could you then insert it vertically?

Ans. I could in the bending die.

101st X Int. Will you please explain how you could insert a larger diameter into a smaller one, both being solid substances and neither elastic?

Ans. I don't think it could be done.

102d X Int. Then if the die, Fig. 6, being a solid block, was made only large enough to receive the shank, it would be impossible to insert the bolt if the collar was first formed on it?

Ans. The diameter of that collar is no larger after the shank is drawn than the diameter before it is drawn, or when it left the bending die.

103d X Int. Does it require another operation by dies after the bolt leaves the die, Fig. 6, to form a collar on it?

Ans. It does.

104th X Int. And Fig. 6 is the bending die, you say?

Ans. I should judge it to be so from the drawing.

105th X Int. Now, was not the bending die used by the defendant constructed in two parts in such manner that the collar which had been previously formed on the bolt was inserted sideways in the die previous to the operation for bending the clips?

Ans. The collar had not been formed previously to the operation of the bending die.

37 106th X Int. Are you willing to swear that that was the case at the defendant's works; might you not be mistaken?

Ans. I am willing to swear that the collar was not formed on the bolt until after it had left the bending die.

107th X Int. What do you call the bending die?

Ans. The die used for bending the clip arms as represented in Fig. 6.

108th X Int. Please look at the drawing which I now show you of the bending die used by the defendant and say if it does not show a lower die made in two pieces, in which the collar which had been previously formed on the bolt is inserted sideways into the die before the operation of bending the clips. The drawing shown is marked "Defendant's Exhibit No. 1."

Ans. It does not represent a bending die.

109th X Int. Then what does it represent?

Ans. A clamping die.

110th X Int. Does it not represent a pair of dies, the upper one of which bends the arms or clips of the bolt?

A. They represent the clamping dies that finish the clip after it is bent.

111th X Int. Question repeated.

Ans. The upper one is the plunger. It fills the space between the clips and forces them on the bottom die to finish the clip.

Ques. 110 is repeated with a request for an answer, yes or no.

Ans. The two lower ones represent a pair of dies used for clamping king bolts; the upper one represents a punch or plunger used for the same purpose.

38 112th X Int. Please look at the patent, Fig. 6, and state if the upper die is or is not used for the same purpose as the upper die or plunger in "Defendant's Ex. No. 1."

Ans. No, sir; they are not the same.

113th X Int. Did the defendant use any other die than "Defendant's Ex. No. 1" in binding the arms or clips of the bolts?

Ans. It did.

114th X Int. Please describe.

Ans. Fig. 6 in the patent is a fair representation of it, except the bottom block D. I don't remember whether the bottom bending die used by defendant was one piece or two.

115th X Int. Do you mean to say by that answer that the defendant used that die that you have just described in addition to the pair of dies, "Defendant's Ex. No. 1"?

Ans. He used a pair of bending dies besides the one represented in Exhibit 1.

Question repeated.

Ans. I do.

116th X Int. Which did he use first, Ex. No. 1 or the other?

Ans. He used the other.

117th X Int. Was "Ex. No. 1" used immediately after the others in the operation?

Ans. It was not.

118th X Int. What was used in between them?

Ans. The drawing dies for forming collar and drawing stem.

119th X Int. Will you please explain to me, after putting the bolt through the bending die and then through the collar forming die and then drawing out the stem or shank, what possible good
39 purpose is served by putting the bolt through the die "Defendant's Ex. No. 1"?

Ans. It finished the clip and the neck.

120th X Int. Is it required in this finishing clip, as you say, that you should have an upper die provided with a plunger?

Ans. The upper die and the plunger are the same. The upper die is necessary.

121st X Int. Please state why.

Ans. Because it would be of no use to place a king bolt between the two lower dies, except you had a top die to use with the lower.

122d X Int. Did you ever use the die "Defendant's Ex. No. 1"?

Ans. Not of the defendant's; I have used one just like — at the Atwater Manufacturing Co.

123d X Int. While you were employed there?

Ans. Yes, sir.

124th X Int. Did you use any dies other than those for forming the shanks at the defendant's works?

Ans. I did not.

THOMAS C. HANCOCK.

Sworn to before me—

F. G. INGERSOLL,
Notary Public.

Adjournment to Wednesday, June 23, 1880, at 10 o'clock a. m., same place.

40 WEDNESDAY, *June 23d*, 1880.

Met pursuant to adjournment.

Present: George S. Prindle, Esq., and C. R. Ingersoll, Esq., counsel for complainants, and H. T. Fenton, Esq., counsel for defendant.

GEORGE S. ATKINS, a witness, produced by and on behalf of the complainants, having been duly cautioned and sworn to questions propounded by C. R. INGERSOLL, Esq., of counsel for complainant, answered as follows:

125th Int. What is your name, age, residence, and occupation?

Ans. Geo. S. Atkins; 23; Mildam, town of Southington; machinist.

126th Int. What experience have you had in the construction of dies for the manufacture of clip king bolts?

Ans. I have had some experience for the last year where I am to work now. Have had some before I went to the Beecher Manufacturing Co., while at work with Mr. Houchin of the Atwater Manufacturing Co., when I was serving my time.

127th Int. What experience have you had in the operation of such dies?

Ans. I have never had any experience in using the dies, only in looking after the work to see it comes right. When I made the dies I have looked at the work to see that it was right—that's all I can say to it.

128th Int. For how far back has this construction of such dies and seeing their operation been a part of your occupation?

Ans. Six years.

41 129th Int. When did you work for the Beecher Manufacturing Co.—the defendant?

Ans. I worked from the 25th September, 1877, till January 3d, 1879.

130th Int. For how long before that had you worked for the Atwater Co.?

Ans. Five years.

131st Int. While you were at work, as you have stated, for the defendant, did they manufacture clip king bolts by the use of dies?

Ans. They did.

132d Int. What were the dies called by which the clips of the bolt were formed?

Ans. Welding or forming die.

133d Int. After the blank was subjected to that die, was there any further operation to make the clip; if so, what?

Ans. There was a trimming and bending of it.

134th Int. How was the bending done?

Ans. The bending was done under a press. It was done by the operation of the press.

135th Int. Were there any dies operated by the press?

Ans. There was a former in the press that bent the bolt into shape.

136th Int. Look at the drawings of the reissued patent Exhibit A, and state if the blank which was put into the welding die is represented by any of the figures; and, if so, designate it?

Ans. Fig. 1.

137th Int. Do you find any representation there like the
42 blank, after it was subjected to the welding die, and before subjected to the bending die?

Ans. Fig. 2 there is like it, excepting there is no transverse groove across the center.

138th Int. Is there anything there to show how the blank looked after coming from the bending die?

Ans. Fig. 3 shows that.

139th Int. Look now at Fig. 5 and state whether or not the impressions in the welding dies used by the defendant at that time are like the impressions shown in that figure; if there is any difference point it out?

Ans. There is no transverse groove across the die in Fig. 5, and there is in theirs, and the top die is different by there not being a raise in the center of the die.

140th Int. In other respects were they or not the same?

Ans. In other respects the impression was the same.

Ans. It was not.

118th X Int. What was used in between them?

Ans. The drawing dies for forming collar and drawing stem.

119th X Int. Will you please explain to me, after putting the bolt through the bending die and then through the collar forming die and then drawing out the stem or shank, what possible good
39 purpose is served by putting the bolt through the die "Defendant's Ex. No. 1"?

Ans. It finished the clip and the neck.

120th X Int. Is it required in this finishing clip, as you say, that you should have an upper die provided with a plunger?

Ans. The upper die and the plunger are the same. The upper die is necessary.

121st X Int. Please state why.

Ans. Because it would be of no use to place a king bolt between the two lower dies, except you had a top die to use with the lower.

122d X Int. Did you ever use the die "Defendant's Ex. No. 1"?

Ans. Not of the defendant's; I have used one just like — at the Atwater Manufacturing Co.

123d X Int. While you were employed there?

Ans. Yes, sir.

124th X Int. Did you use any dies other than those for forming the shanks at the defendant's works?

Ans. I did not.

THOMAS C. HANCOCK.

Sworn to before me—

F. G. INGERSOLL,
Notary Public.

Adjournment to Wednesday, June 23, 1880, at 10 o'clock a. m., same place.

40 WEDNESDAY, *June 23d*, 1880.

Met pursuant to adjournment.

Present: George S. Prindle, Esq., and C. R. Ingersoll, Esq., counsel for complainants, and H. T. Fenton, Esq., counsel for defendant.

GEORGE S. ATKINS, a witness, produced by and on behalf of the complainants, having been duly cautioned and sworn to questions propounded by C. R. INGERSOLL, Esq., of counsel for complainant, answered as follows:

125th Int. What is your name, age, residence, and occupation?

Ans. Geo. S. Atkins; 23; Mildam, town of Southington; machinist.

126th Int. What experience have you had in the construction of dies for the manufacture of clip king bolts?

Ans. I have had some experience for the last year where I am to work now. Have had some before I went to the Beecher Manufacturing Co., while at work with Mr. Houchin of the Atwater Manufacturing Co., when I was serving my time.

127th Int. What experience have you had in the operation of such dies?

Ans. I have never had any experience in using the dies, only in looking after the work to see it comes right. When I made the dies I have looked at the work to see that it was right—that's all I can say to it.

128th Int. For how far back has this construction of such dies and seeing their operation been a part of your occupation?

Ans. Six years.

41 129th Int. When did you work for the Beecher Manufacturing Co.—the defendant?

Ans. I worked from the 25th September, 1877, till January 3d, 1879.

130th Int. For how long before that had you worked for the Atwater Co.?

Ans. Five years.

131st Int. While you were at work, as you have stated, for the defendant, did they manufacture clip king bolts by the use of dies?

Ans. They did.

132d Int. What were the dies called by which the clips of the bolt were formed?

Ans. Welding or forming die.

133d Int. After the blank was subjected to that die, was there any further operation to make the clip; if so, what?

Ans. There was a trimming and bending of it.

134th Int. How was the bending done?

Ans. The bending was done under a press. It was done by the operation of the press.

135th Int. Were there any dies operated by the press?

Ans. There was a former in the press that bent the bolt into shape.

136th Int. Look at the drawings of the reissued patent Exhibit A, and state if the blank which was put into the welding die is represented by any of the figures; and, if so, designate it?

Ans. Fig. 1.

137th Int. Do you find any representation there like the

42 blank, after it was subjected to the welding die, and before subjected to the bending die?

Ans. Fig. 2 there is like it, excepting there is no transverse groove across the center.

138th Int. Is there anything there to show how the blank looked after coming from the bending die?

Ans. Fig. 3 shows that.

139th Int. Look now at Fig. 5 and state whether or not the impressions in the welding dies used by the defendant at that time are like the impressions shown in that figure; if there is any difference point it out?

Ans. There is no transverse groove across the die in Fig. 5, and there is in theirs, and the top die is different by there not being a raise in the center of the die.

140th Int. In other respects were they or not the same?

Ans. In other respects the impression was the same.

141st Int. Look now at Fig. 6 and state whether or not it fairly represents the impression of the bending dies then and there used?

Ans. The impression in the bending die is the same, excepting it is on a different angle. The top die in the drawing is more of a U shape than the defendant's; the bottom die corresponded with the top die.

142d Int. What was the object and effect upon the blank of the transverse impression and corresponding ridge which you say were contained in the welding die of defendants?

(Objected to, because the witness has testified that he never used that die at defendant's works.)

43 Ans. The object in putting that transverse groove and corresponding ridge on the top die was to center the bolt when trimming it and bending it. It left a transverse impression across the clip of the bolt.

143d Int. In what respect would the blank shaped on such dies as are shown in Fig. 5 of the patent differ from the blank shaped by the die with the transverse groove and ridge added?

(Objected to, because there is no evidence to show that the witness has ever used a pair of dies shaped as in Fig. 5, and is therefore not competent to say what shape bolt would be produced from them; and secondly, that it does not appear that he has had any experience in the use of defendant's die with the transverse impression.)

Ans. It would differ in the transverse groove. That's the only way it would differ.

144th Int. Do you mean the transverse impression referred to in answer to Int. 142?

(Objected to, as leading.)

Ans. I do.

145th Int. Were or not the dies made by you and used by the Atwater Co., before you went to the defendant's company, provided with transverse groove and ridge?

Ans. They were.

146th Int. When did you last see, at the defendant's works, such dies as you have described as having been in use by them, while you were in their employ?

44 Ans. I can't tell exactly. Neighborhood of a year, I think, this month.

Cross-examination by H. T. FENTON, Esq., counsel for defendant:

147th X Int. How long have you last resided in Southington?

Ans. It's a question I can't answer exactly.

148th X Int. Did you live there in June, 1879?

Ans. I did.

149th X Int. Were you, in June, '79, and since then, and now, in the employ of the Atwater Co., one of the plaintiffs in this case?

Ans. I was then, and still.

150th X Int. How did you come to see the dies in the defendant's works after you left the defendant's employ?

Ans. While passing through the shop.

151st X Int. What was your business at the shop at that time?

Ans. My business wasn't anything in particular.

152d X Int. Your business was to go there and see these dies, having been instructed to do so by one of the officers of the Atwater Co., isn't that so?

Ans. I didn't say so. I wasn't instructed by anybody.

153d X Int. Did you go to Meriden—to the defendant's works—to see the dies on that occasion of your own free will, and on your own business, or did you not go at the instance and request of the Atwater Co.'s officers?

Ans. I didn't go to see any dies, and I went of my own free will.

45 154th X Int. How do you fix the date as June, 1879, as the time you went?

Ans. Because it was just before July—just before shutting down time.

155th X Int. Have you been to Meriden more than once since you left the defendant's employ in January, '79?

Ans. I have been to Meriden three times. I can't state the dates nor the months?

156th X Int. If you went in June, 1879, to the shops on no particular business, and at nobody's request, how are you able now to fix the date of that particular visit so accurately?

Ans. I did not fix a date. I can answer as I did before. It was just before July, and they shut down there in July.

157th X Int. While you were at the defendant's shops, can you say that you saw there any clip king bolts with wings or flanges a', as the same are shown in Figs. 3 and 4 in this patent?

Ans. Can't say as I saw any with wings or flanges.

158th X Int. Then in answer to a question on direct examination, where you said that the defendant made bolts like those represented in Fig. 3 in the patent (the question referred to is 138), you were in error in stating that the bolt had wings or flanges a', as in Fig. 3, were you not?

Ans. I didn't notice those flanges when I answered question 138?

159th X Int. In answer to question 145, you stated the Atwater Co. used the welding dies with a transverse groove and ridge prior to the time you entered the defendant's employ; state how long, as far as you know, they had been using such dies—that is, dies with transverse groove and ridge.

46 Ans. They have been using them for six years. Not six years from before I went to Beecher. Six years from now back.

160th X Int. Did you ever see at the Atwater Co.'s works any dies constructed exactly as shown in Fig. 5 of the patent?

Ans. No.

161st X Int. You stated the object of the transverse groove and ridge in answer to question 142; did you derive that knowledge from in-

formation received from others, or did you derive it from actual experience in forming bolts on the dies?

Ans. I derived that information from another—from the foreman.

162d X Int. Look at Fig. 6 of the patent and state if it does not represent to you a lower die, solid, and in one piece. I also refer you to the transverse section of that figure, meaning Fig. 9.

Ans. It represents a solid piece.

163d X Int. Is the cavity in that lower die, Figs. 6 and 9, shaped to receive a king bolt blank which has previously had a collar formed on it?

Ans. No, sir.

164th X Int. Were you not mistaken in saying, in answer to Int. 141, that the defendant used a bending die the lower block of which was like Figs. 6 and 9, that is, in one solid piece?

Ans. I don't think I was.

165th X Int. Question repeated and counsel adds, please refresh your memory by looking at a sketch "Defendant's Exhibit No. 1," now shown to you.

Ans. The dies represented by "Defendant's Exhibit No. 1" are not the dies I refer to.

166th X Int. Do you mean to say that the defendant did
47 not use a pair of dies for forming king bolts, as shown in "Defendant's Exhibit No. 1"?

Ans. They used those dies as shown in that "Defendant's Exhibit No. 1," but not till after they had been bent under the press and the stem of the bolt drawn out under the hammer.

167th X Int. Did you have any experience in the use of any of the dies at the defendant's works.

Ans. No, sir.

Redirect examination:

168th R. D. Int. State more particularly than you have what your means of acquaintance with defendant's dies were.

Ans. By watching them use them.

GEORGE S. ATKINS.

Sworn to before me—

F. G. INGERSOLL,
Notary Public.

WILLIAM BEACH, a witness produced by and on behalf of the complainant, being duly cautioned and sworn, to questions propounded by C. R. INGERSOLL, Esq., of counsel for complainant, answered as follows:

169th Int. What is your name, age, residence, and occupation?

Ans. William Beach; 37; Plantsville, Southington; blacksmith.

170th Int. Were you ever in the employ of the defendant, Beecher Manufacturing Co., and, if so, during what period?

48 Ans. I was, in 1879; from the last of July to the 21st of November.

171st Int. While there did you have anything to do with the manufacture of clip king bolts, and if so, what?

Ans. I split them under a drop.

172d Int. Look at patent, "Defendant's Exhibit A," and state if either of the drawings represent the state of the blank after being so split by you under the drop?

Ans. They do; fig. 1.

173d Int. After the blank was thus formed, what was done with it.

Ans. It was taken to the next drop, put into the fire and welded up.

174th Int. Describe that process of welding.

Ans. Put into the fire and heated to a white heat, it was then put into a hole in the lower die, the upper die coming down and welding up the bolt which was knocked out of the hole with a pin, which you struck with a hand hammer with a lever.

175th Int. What was next done with it?

Ans. It was next put into a trimming die, trimmed and bent.

176th Int. Do you mean bent after being trimmed?

Ans. Yes, sir.

177th Int. How was that done?

Ans. The bending was done by a plunger keyed into the top of the bushen, that went into the press in the bottom die; there was a hole where you picked up the king bolt, put it into this hole, the plunger coming down strikes it, bends the bolt up.

178th Int. What is next done with it?

49 Ans. It went to the hammer and was necked; shank drawed on it, it then went to the clamping dies, from the clamping dies it went on to another hammer and was water finished.

179th Int. Now please describe more particularly the first set of dies which you call welding dies, and to do so you may refer to the models B and C.

Ans. These models are about as near as you could get them, with the exception that the clip is wider close to the hole in the defendant's die than in the models, in proportion.

180th Int. Referring to the model, what is the object in the die of the transverse impressions as shown by the model?

(Objected to, for the reason that it has not been shown that the witness has ever used any of the dies similar to the model, and is not called on as an expert.)

Ans. It is to strike the clip trimmer in the king bolt at that point.

181st Int. Did it serve any other purpose?

(Same objection.)

Ans. No; only it made the king bolt wider there.

182d Int. Didn't it assist in the bending?

Ans. Yes; you could get them into the trimming dies of your press easier.

183d Int. Look at the drawing, fig. 5, in re-issued patent, Exhibi A, and state how the blank turned out the die there represented would differ, if at all, from the blank turned out of dies made like the model?

50 (Same objection, and for the further reason that it has not been shown that the witness used any of the dies shown in Fig. 5 of the patent.)

Ans. I don't think that they would differ at all.

184th Int. What opportunities had you for seeing the operation of these welding dies in defendant's works?

Ans. Because I ran the next drop to where the work was done.

185th Int. How near was your drop to that?

Ans. Probably was six to eight feet.

186th Int. Did you ever have occasion to use that drop with the welding dies yourself?

Ans. No, sir.

187th. Int. Did you ever operate the dies?

Ans. No further than splitting them.

188th Int. Have you operated welding dies of this sort?

Ans. Well, not exactly the same sort.

189th Int. Now describe the impression and operation of the bending dies used there, and for that purpose you may refer to fig. 6 of the patent?

(Objected to, as leading.)

Ans. It is as near like it as anything I ever saw.

190th Int. What were your opportunities for seeing those dies and their operation?

Ans. A great many times, when I was blowing up a fire I would stand by the side of the drop and press in which the bolt was made.

191st Int. And observed its operation, do you mean?

51 A. Yes, sir.

192d Int. You have spoken of a set of clamping dies; what were they and what did they do?

Ans. They clamped the clip to the king bolt. The bolt was put in between a pair of dies, the front die being shoved up to the back one with a lever, the plunger coming down striking the king bolt, formed it, making the clip smoother.

193d Int. Were all these dies that you have described used by the defendants, as you have described, during the entire time you were with them?

Ans. They were.

Cross-examination by H. T. FENTON, Esq., counsel for defendant:

194th X Int. Did you do anything more in the defendant's establishment than splitting the blanks preparatory to putting it into the first die?

Ans. I did not on the king bolts.

195th X Int. Please look at Fig. 5 of the patent, and state if the short transverse recesses *b* are not designed to form and do necessarily form a bolt, which will have arms or flanges marked *a'*, in Fig. 3?

Ans. Not necessarily if the trimming die trims it off.

196th X Int. Is the trimming die used before or after Fig. 5?

Ans. Used after.

197th X Int. Then by your previous answer did you mean that a die constructed as shown in Fig. 5, would produce a blank which would necessarily have arms or flanges *a'*, as in Fig. 3, but
52 in making up the bolt this arm might be cut off in the successive operation in the trimming die?

Ans. I don't see any arm or flanges myself in fig. 5. No more flanges than what there is to any bolt before it goes into the trimming die.

198th X Int. Question repeated. I referred you to fig. 3.

Ans. I don't know what you call arms; I never heard it used about a king bolt before.

199th X Int. I refer you to the patent to find out, then please answer the question.

Ans. The bolt was wider on the center than it was to the ends of the clip.

200th X Int. Do you now know what I mean by the arms at flanges *a'* in fig. 3 of the patent?

Ans. I don't know what you mean by arm on this bolt; never heard it called that before.

201st X Int. Do you mean to swear that you do not know what part of the king bolt I refer to by arms or flanges *a'* in fig. 3?

Ans. The clip commences at this letter *a*—the large A is the neck.

202d X Int. Question repeated with a request for an affirmative or negative answer?

Ans. I never heard it called arms—I should call it clip.

203d X Int. Look at "Defendant's Ex. No. 1" and say if that drawing represents what you call the clamping die used at the defendant's works, and described in your answer to direct question 192?
53 Ans. The dies in the drawing resemble those used in defendant's works while I worked there.

204 X Int. In answer to direct question 189, you described what you called bending dies used at defendant's works; please state what was the shape of the plunger in that bending die?

Ans. The plunger was nearly in shape of a U, not quite, but nearly—nearer a U than a V.

205th X Int. In answer to a question in direct examination you stated the object of the transverse depression in the model Exhibits B and C, did you state that from your actual experience, or from information derived in defendant's shop? The question referred to is No. 180.

Ans. I know it, by seeing it when I worked in the shop.

206th X Int. Are you at present in the employ of the Atwater Co., one of the plaintiffs in this case, and how long have you been in their employ?

Ans. I am in their employ, and have been in their employ since last January. I do what they set me to do—forging shackles, body loops, cockeyes, in the forging shop.

WILLIAM BEACH.

Sworn to before me— F. G. INGERSOLL,
Notary Public.

Complainants rest their case in chief, and it is agreed that the defendant shall proceed with his proofs on Wednesday and Thursday, July 7th and 8th, at 11 o'clock a. m., in New York city, to be there adjourned to the first week in September, and closed during that week, and the plaintiffs will close their case in rebuttal within thirty days after defendants close their case.

54 UNITED STATES PATENT OFFICE.

ROBERT R. MILLER, of Plantsville, Connecticut, assignor by mesne assignments, to himself, J. B. Savage, and Atwater Manufacturing Company.

Improvement in Series of Dies for Forming the Heads of King Bolts.

Specification forming part of Letters Patent No. 100,053, dated February 22, 1870; Reissue No. 8694, dated May 6, 1879; application filed March 4, 1879.

To all whom it may concern:

Be it known that I, Robert R. Miller, of Plantsville, in the county of Hartford and State of Connecticut, did invent certain new and useful improvement in dies for forming the heads of king bolts, for which letters patent No. 100,053 were issued to me upon the 22d day of February, 1870, which letters patent have been found defective in that the specification and claims do not cover all of the invention shown and described in the application filed by me upon the 31st day of July, A. D. 1869. Now, therefore, being desirous of reissuing the letters patent, I have prepared and do hereby declare
55 the following to be a full, clear, and exact description of my said invention, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a perspective view of the blank used in the formation of my king bolt. Fig. 2 is a like view of the same after passing through the forming dies. Fig. 3 is a perspective view of said blank after having been operated upon by the bending dies. Fig. 4 is a like view of the completed king bolt. Fig. 5 is a perspective view of the dies used for forming the clip arms, said dies being separated from each other. Fig. 6 is a like view of the dies used for bending said clip arms to shape. Fig. 7 is a central longitudinal section of said forming dies as they appear when closed together with a clip blank within the lower die; and Figs. 8 and 9 are, respectively, longitudinal and cross sections of the bending dies upon central lines as they appear with the completed king bolt between their faces.

Letters of like name and kind refer to like parts in each of the figures.

The design of my invention is to enable clip king bolts to be easily and cheaply made by machinery; to which end it consists,

principally, in the forming dies constructed in the manner substantially as hereinafter shown.

It consists, further, in the series of dies, substantially as and for the purpose hereinafter shown and described.

In the construction of king bolts I employ a blank, A, which is formed by splitting the end of a metal bar longitudinally for a distance of about two inches, turning the forks or arms *a* outward at substantially a right angle with each other, and then
56 severing said blank from the bar at such distance below said arms as to leave the necessary metal for forming the spindle.

The next operation consists in giving form to the arms *a*, which is accomplished by the following described means: Within the upper side of a metal block, B, is formed a vertical central opening *b*, that corresponds in general shape and diameter to the like features of the body of the blank A, and has such depth as may be desired for said part. Extending lengthwise of the block B is half a round groove *b'*, which intersects the opening or recess *b*, and has a slightly greater depth at its ends than at its longitudinal center, and a slightly greater width at the latter point than at said ends. At the upper end of said recess *b* the corners are rounded, as shown. The blank A is suitably heated and placed within the die B, its body being within the recess *b'*, and its arms *a* over the grooves *b'*, after which a plane-faced upper die, C, is caused to impinge one or more times upon said blank until the latter is caused to conform to and fill recess and groove, said arms being in a line with each other, as seen in Fig 2. The blank A is now relieved of its projecting fin by any suitable means, after which it is operated upon by a second set of dies, as follows: A block, D, is provided with a U-shaped cavity *d*, within and extending longitudinally across its upper side, and has at the bottom of such cavity a vertical recess d^1, that corresponds to the size and shape of the body of the blank A. From the recess d^2 a groove d^1 extends outward and upward within the sides of the cavity *d*, and has such depths and traverse such dimensions and shape as will cause it conform to the like features of the finished arms *a* of the blank A, said grooves being increased in width
57 at the bottom of said cavity until they extend upon each side of said recess d^2, a distance equal to the entire breadth of other portions of said arms. An upper die, E, is provided upon the lower side with a projection *e*, which corresponds in shape and size to the cavity *d* of the die D and fills the same when said dies are brought together. The blank A is taken as it comes from the die B and placed across the cavity *d* of the die D, the body of said blank being directly over the recess d^2, and its arms over and in a line with the grooves d^1, after which the die E is caused to strike one or more blows upon said blank, such operation causing the latter to be bent to the form shown in Fig. 3, and the surplus metal at the point where said arms join said body to be thrown outward and form wings or lips *a'*. The king bolt is completed by drawing out the shank A, and by rounding and threading the ends of the clip arms *a*, as shown in Fig. 4, any desired or usual means being employed for such purpose.

Having thus fully set forth the nature and merits of my invention, what I claim as new is—

1. The die B *b b'* and the die C, constructed and combined substantially as and for the purpose shown.

2. The series of dies B, C, D, and E for forming clip king bolts, substantially as shown and described.

In testimony that I claim the foregoing I have hereunto set my hand, this 21st day of February, A. D. 1879.

R. R. MILLER.

Witnesses:
GEO. S. PRINDLE.
MARCUS H. HOLCOMB.

58 United States Circuit Court, District of Connecticut. In Equity.

THE ATWATER MANUFACTURING COMPANY *et al.*
vs.
THE BEECHER MANUFACTURING COMPANY.

I, Francis G. Ingersoll, a notary public in and for the State of Connecticut, do certify that the foregoing depositions were taken before me, upon the days in the body of said depositions named, to be used on the part of the complainants in the above-entitled suit. That said depositions were reduced to writing by me in the presence of and from the statements of the witnesses, who subscribed said depositions, and in the presence of the counsel for the respective parties.

That the witnesses were duly sworn by me and subscribed the said depositions before me.

That I am not of counsel nor attorney for either of the parties in said depositions and caption named, or in any way interested in the event of said cause named in said caption.

In testimony whereof I have hereunto set my hand and seal, this 23d day of June, 1880, A. D.

[SEAL.] FRANCIS G. INGERSOLL,
Notary Public for Conn.

59 And on the same day defendant's evidence was filed, in the words and figures following, viz:

United States Circuit Court, District of Connecticut. In Equity.

THE ATWATER MANUFACTURING COMPANY
vs.
THE BEECHER MANUFACTURING COMPANY.

Testimony on behalf of the defendants, taken before John A. Shields, Esqr., United States commissioner, acting as special examiner, by consent, at his office in New York city, on Thursday, the 8th day of July, at 11 a. m.

Appearances: H. T. Fenton, Esqr., for the defendant; Charles R.

Ingersoll, Esqr., and George S. Prindle, Esqr., of Washington, for the complainants.

Defendants offer in evidence a certified copy of file, wrapper, and contents in the matter of the application for reissued letters patent granted to Robert R. Miller and others, dated May 6, 1879, No. 8684, being the reissue patent mentioned in the bill filed, marked Exhibit No. 2.

Defendants also offer in evidence a certified copy of the file, wrapper, and contents in the matter of the application of
60 letters patent granted to Robert R. Miller and others, dated February 22, 1870, No. 100,053, marked Exhibit No. 3.

Defendants offer in evidence Patent Office printed copy of the original letters patent, dated February 22, 1870, No. 100,053, to Robert R. Miller, complainants waiving the certificate, marked Exhibit No. 4.

Defendants also offer in evidence Patent Office printed copy of the letters patent granted to F. B. Morse, No. 96251, dated October 26, 1869, for improved series of dies for forming king bolts, complainants' counsel waiving certificate, marked Exhibit No. 5.

JOSIAH WILCOX, a witness called in behalf of the defendants, being first duly sworn, testifies as follows:

By Mr. FENTON:

Ques. 1. Please state you name, age, residence, and occupation.

Ans. 1. I am 76, last May; my occupation is manufacturer for the last fifty-two years, nearly; business residence, Portchester, New York.

Ques. 2. What do you manufacture?

Ans. 2. I manufacture carriage hardware.

Ques. 3. How long have you been in the business of manufacturing carriage hardware?

Ans. 3. This carriage hardware business I have been in about twenty-one or twenty-two years.

Ques. 4. During all that time at Portchester, New York?

Ans. 4. Yes, sir.

Ques. 5. In the course of your business have you manufactured any king bolts for carriages, and when did you begin
61 the manufacture of such, and where?

Ans. 5. I began the manufacture of the king bolts in 1851, probably a little sooner; but I did not throw them into the market till the year 1859, as my books will show.

Ques. 6. Can you produce a sample of the king bolts you made at that time?

Ans. 6. Yes, sir.

(Witness produces a sample, and says: "This is the first one I made; I made it at Portchester.")

Ques. 7. When did you make this?

Ans. 7. I made it that year—1859, or about that; probably a little before; because I did not find them on my book. We made a few

before I had them on my book, before I had them in the market; it was either 1859 or 1858, but not later than 1859.

Ques. 8. Did you make this king bolt by hand, or by machinery?

Ans. 8. Well, I headed it in a die—by hand, we should call it.

Ques. 9. Have you got the die here?

Ans. 9. Yes, sir. (Produced.) I could not find the original one I made, but I made a wooden one as near as I could. That was headed down by another die on top.

(Defendant's counsel offers in evidence the king bolt and the wooden model of die produced by the witness, which are marked as one Exhibit No. 6.)

Ques. 10. Can you produce any sample of king bolt made
62 by you after you made Exhibit 6?

Ans. 10. Yes, sir.

Ques. 11. Produce the next one you made after that.

(Witness produces a king bolt.)

Ques. 12. Please state when you made this, and where.

Ans. 12. I made it in my factory, and not far from the year 1863.

Ques. 13. At Portchester, you mean?

Ans. 13. Yes, sir.

Ques. 14. Can you produce any of the dies used by you in its manufacture in 1863?

Ans. 14. Yes, sir.

Ques. 15. Please produce them.

(Witness produces a die.)

Ques. 16. Please explain how this die was used by you.

Ans. 16. I had what was called a foot vise. This is only half of the die, and I could not find the other half.

Ques. 17. Will you please state whether or not any fuller or upper die was used in connection with this?

Ans. 17. There was.

Ques. 18. Please state how it was constructed and how it operated.

Ans. 18. Right on top there.

Ques. 19. Please explain more fully its construction and operation.

Ans. 19. That die was in a foot vise, also a mate to it; this is only half of it.

Ques. 20. Now, please to proceed and explain the operation and construction of the fuller or upper die you refer to.

63 Ans. 20. It was another die struck right there, on the top of the king bolt, to fetch the king bolt true and smooth.

(Defendant's counsel offers in evidence the section of the die and the king bolt referred to by the witness, marked Exhibit No. 7.)

Ques. 21. Can you produce any other dies that you used at Portchester in the manufacture of king bolts?

Ans. 21. Yes, sir.

Ques. 22. Please produce them.

(Witness produces a die, which is offered in evidence by defendants, and marked Exhibit No. 8.)

Ques. 23. Is this the whole die?

Ans. 23. Half of the die; I could not find the other part.

Ques. 24. When did you use this in the manufacture of king bolts?

Ans. 24. I used it five or six years.

Ques. 25. When?

Ans. 25. From 1863 up near to 1868, probably to 1869.

Ques 26. In connection with Exhibit No. 8, did you in like manner use the fuller or upper die, as with No. 7?

Ans. 26. The same as I did the other, only made them wider, and fitted further up; an improvement, I call it, from the first.

Ques. 27. Can you produce any king bolt made on this die Exhibit 8?

Ans. 27. I think there is not any; we could not find any.

Ques. 28. In connection with these several dies, Nos. 6, 7, and 8, did you use any other dies for forming or bending the king
64 bolt?

Ans. 28. No other.

Ques. 29. Have you kept any books in your business which enables you to state accurately the several dates when you used these dies and made these king bolts?

Ans. 29. Yes, sir.

Ques. 30. And have you examined such books previous to testifying here?

Ans. 30. Yes, sir.

Cross-examined by Mr. INGERSOLL:

X Ques. 1. Are you familiar with the dies patented to this concern by the patents on which this suit is brought?

Ans. 1. Yes, sir.

X Ques. 2. Have you ever used in your manufacture of king boltts such dies, or any of them?

Ans. 2. Such as what?

X Ques. 3. The Miller.

Ans. 3. I used the solid die after I got the drop. I used the solid die first, then went to the drop, and then set them with the solid die; finished them in the open die, like this (Exhibit 8).

X Ques. 4. Do you mean to say you regard these dies which you have put in evidence this morning as being the same in construction with the dies patented to Miller?

Ans. 4. The same, only one was in a drop, and the other by foot; the principle is the same—the idea.

X Ques. 5. When did you commence using the drop?

Ans. 5. About 1870; 1869 or 1870.

65 X Ques. 5½. Since you commenced using the drop have you varied the construction of your dies?

Ans. 5½. We make improvements all the time, from year to year.

X Ques. 6. Have you, in fact, made improvements in the construction of these dies from year to year since 1870?

Ans. 6. No; we were only making the bolt wider.

X Q. 7. In your direct examination you have spoken of a fuller as being used by you. What was that fuller?

Ans. 7. We should call it a die now; that was an old fashioned name.

X Ques. 8. My question is not what it is called, but what it was. Describe it.

Ans. 8. It is a die; one end is a llttle round toward the bottom, and they strike on top of it with a sledge.

X Ques. 9. Did that fuller have a handle in it at any time?

Ans. 9. We held it by tongs; we had no drop to hold it in; we would hold it in something; sometimes we would have a handle, and sometimes in tongs.

X Ques. 10. You mean a handle like a hammer, sometimes?

Ans. 10. Well, it resembled it some, perhaps.

Redirect by Mr. FENTON:

Rd. Ques. 1. What do you mean by a drop?

Ans. 1. I mean by a drop a thing that lifts up by water power and lets a blow come down on the iron.

Rd. Ques. 2. In brief, do you mean a hammer worked by machinery, in lieu of one worked by hand?

Ans. 2. Yes, sir; that is just what I mean.

66 Recross by Mr. INGERSOLL:

Re-X Ques. 1. When were you first requested by these defendants to testify in this case?

Ans. 1. I could not tell you; well, say six months; I would not swear to that definitely; I would have to go on my memory.

Re-X Ques. 2. Have you ever been notified by the complainants or their attorney that you were infringing the Miller patent?

Ans. 2. Yes, sir.

Ques. Was it before or after that that you were asked to be a witness for the defendants?

Ans. I have been notified a number of times that I was infringing. The first was about a year ago; and then I have been again, since then, notified. I should think it was since I was first notified I was asked to be a witness.

Re-X Ques. 3. When you were notified by the complainants that they regarded you as infringing their patent, did you or not admit that you were doing so?

Ans. 3. Never.

Re-X Ques. 4. Did you agree to stop using their dies?

Ans. 4. No, sir.

Re-X Ques. 5. Did you offer to pay them royalties or damages for past infringements?

Ans. 5. No, sir.

Re-redirect by Mr. FENTON:

Re-Rd. Ques. 1. Has any suit been brought against you
67 for infringement of the Miller reissue patent?

Ans. 1. No, sir.

JOSIAH WILCOX.

Subscribed and sworn to before me, this 6th day of August, 1880.

JOHN A. SHIELDS,
U. S. Commissioner of the Southern District of New York, and Special Examiner, &c.

GEORGE E. WILCOX, a witness called on behalf of defendant, being first duly sworn, testifies as follows:

By Mr. FENTON:

Ques. 1. Please state your name, age, residence, and occupation.

Ans. 1. Age, 48; my occupation is in business in connection with the last witness—he is my father—at Portchester, New York; carriage hardware.

Ques. 2. How long have you been in business with your father at Portchester, in the manufacture of carriage hardware?

Ans. 2. I have worked with him ever since I was 17 years old; that is thirty-one years ago.

Ques. 3. During that time please state whether or not there was manufactured by your father at Portchester, New York, any king bolts for carriages.

Ans. 3. There were.

Ques. 4. Please look at the samples of king bolts, Ex-
68 hibits 6 and 7, and state if you recognize them, or either of them, as samples of king bolts made by your father at that place.

Ans. 4. I think I recognize them as the original ones. I turned this Exhibit 6 myself, individually.

Ques. 5. Can you recollect the dates when these two king bolts 6 and 7 were made?

Ans. 5. They were made the last of the year 1858, or the early part of the year 1859; first put in the market, I think, in 1859; I think the first charge was in March, 1859.

Ques. 6. Have you refreshed your memory by any books or papers in your own handwriting as to these dates?

Ans. 6. I have; my father's books are all in my handwriting.

Ques. 7. Please look at the dies 6, 7, and 8, and state if you recognize them as any dies that were used at your father's place in Portchester when you were with him.

Ans. 7. I recognize all of these.

Ques. 8. Please state the several dates when each of those dies, 6, 7, and 8, were used there.

Ans. 8. 6 was used about the last of 1858, or fore part of 1859; No. 7 was used about the same time as No. 6; No. 7 must have been used in 1862; I recollect it by getting a foot vise in 1862; and No. 8 was used after No. 7.

Ques. 9. For how many years, and during what years, did you use dies 6, 7, and 8?

Ans. 9. No. 6 we did not use any longer than 1862; No. 7 we used 1862 and 1863; and No. 8 about 1863; we used No. 8 from 1863 to 1869 or 1870; we got a new drop in 1870.

69 Ques. 10. Will you please state the exact operation of the several dies used at your father's place at Portchester for the manufacture of king bolts between the years 1863 and 1868?

Ans. 10. We first took iron 7-8 square and split it like Exhibit No. 9, only it was square instead of round; then, after it was split, we put it in these dies, Nos. 7 and 8, and drove it down, and smoothed it with a die rounding on the top, to fit on the top of the king bolt.

Ques. 11. Was the piece of metal, Exhibit No. 9, submitted to any other action prior to being put in the die Nos. 7 and 8?

Ans. 11. No, sir.

Ques. 12. Now, after it went through the operation of the die 7 and 8, with the upper die, what else did you do with the unfinished bolt?

Ans. 12. We merely swedged the clips on an anvil to round them.

Ques. 13. Prior to inserting the bolt in the dies 7 and 8, did you strike down the clips?

Ans. 13. No, sir; it was upset first.

Ques. 14. What do you mean by "upset"?

Ans. 14. Make it a little wider in the bearings of the clips.

Ques. 15. How did you make it a little wider in the bearings?

Ans. 15. By having a top die around it.

Ques. 16. Was that done prior to subjecting the bolt to the operation of the die 7 and 8?

Ans. 16. At the same time; that is what it was put in the die 7 and 8 for.

Ques. 17. Did, or did not, the die 7 and 8 answer the
70 double purpose of bending the clips and forming the bolts?

Ans. 17. They did; we left it as it came out of those dies, the clip part; we merely rounded the clip arms, and then put it back again in the same die to smooth it up, and left it as those dies left it.

Ques. 18. Did, or did not, your father use these dies extensively in the manufacture of bolts between the years 1863 and 1868?

Ans. 18. He did.

Ques. 19. Did, or did not, you sell the bolts made on these dies in the United States?

Ans. 19. We did.

Ques. 20. Can you state to me about what quantity of bolts made upon these dies you sold between the years 1863 and 1868?

Ans. 20. I could not tell, but perhaps 3,000 or 4,000 dozen.

Ques. 21. Chiefly in what section of the country?

Ans. 21. All over the country.

Ques. 22. Have you ever read the letters patent granted to the plaintiffs, reissue May 6, 1879, No. 8694?

Ans. 22. I have.

Ques. 23. Please look at the drawings of this patent, figures 5, 6, 7, 8, and 9, and particularly figures 5 and 6, which are therein called bending and forming dies, and state whether or not those dies 5 and 6 perform, in your opinion, any other or different function from the single die Exhibit 7 and 8.

Ans. 23. I think they form just the same.

Ques. 24. Then, if I understand you correctly, the die 7 and 8, in connection with the fuller or upper die that you use
71 with them, both bend and form the bolt in substantially the same manner as is done by two separate dies, figures 5 and 6 of the patent. Is that so?

Ans. 24. Yes, sir.

Ques. 25. In the use of the dies 6, 7, and 8, do you employ any drop, or do you work them by foot power?

Ans. 25. We work them by foot and hand.

Ques. 26. Did you at any time, or do you now, use a drop run by steam or water power?

Ans. 26. We do.

Ques. 27. Is there any difference in the operation of the die, whether it be used by hand or foot power, as formerly, or by drop?

Ans. 27. The operation is the same.

Cross-examined by Mr. INGERSOLL:

X Ques. 1. Have you ever examined the patent in suit before to-day?

Ans. 1. I have.

X Ques. 2. When first?

Ans. 2. When they first sent us notice.

X Ques. 3. When was that, about?

Ans. 3. That was about a year ago, or a little over; I think it was about the 12th of May, 1879. I think we received a letter from Mr. Prindle.

X Ques. 4. And have you received notice since to the same effect?

Ans. 4. We received no notice not to use it. We have received notice since to make up our sales from Messrs. Hol-
72 comb.

X Ques 5. Have you not received notice since, and within the last three or four months, that you would be treated as infringers unless you stopped using the dies which you were then using?

Ans. 5. No, sir; we must pay the royalty. We never had notice not to use the dies.

X Ques. 6. Did you not receive a letter from me within the last three months?

Ans. 6. We did.

X Ques. 7. To the effect that you must stop or you would be prosecuted as infringers?

Ans. 7. I don't recollect the wording of the letter, but we took it we must pay royalty.

X Ques. 8. Who wrote the reply to that letter?

Ans. 8. George E.; that is, myself.

X Ques. 9. Have you a copy of that reply with you?

Ans. 9. I have not.

X Ques. 10. Have you a copy at the office?

Ans. 10. No, sir, I have not. The contents of the reply were merely if the complainants succeeded, we would not contest it. That was the meaning of the reply.

X Ques. 11. Do you recollect the date of that reply?

Ans. 11. I do not. I should think it was about six weeks or two months ago.

X Ques. 12. All along it has been your intention to contest this claim upon you, unless the complainant succeeded in this suit, has it?

73 Ans. 12. If I understand the thing, there was no claim upon us if the Beecher Co. succeeded.

X Q. 13. Do you mean to say that you were notified by me to stop only in case the complainant succeeded in this case against the Beecher Co.?

Ans. 13. Yes, sir; that is, we read it this way; we were to pay royalty on all we made in case they succeeded.

GEO. E. WILCOX.

Subscribed and sworn to before me, this 5th day of August, A. D. 1880.

JOHN A. SHIELDS,
U. S. Commissioner for the Southern District of New York, and Special Examiner.

SAMUEL K. WILCOX, a witness called on behalf of the defendant, being first duly sworn, testifies as follows:

By Mr. FENTON:

Ques. 1. Please state your name, age, residence, and occupation.

Ans. 1. Age, 51; occupation, machinist and die sinker; residence, at Portchester.

Ques. 2. Are you in the employ of Mr. Josiah Wilcox?

Ans. 2. I am.

Ques. 3. How long have you been in his employ?

Ans. 3. I went there when I was 15; I have been in his employ thirty-four years.

Ques. 4. While you were in his employ did you make for him any dies for the bending and forming of king bolts prior to the year 1868?

74 Ans. 4. I did.

Ques. 5. State whether or not those dies which you made for him were used at his place in the manufacture of king bolts.

Ans. 5. They were.

Ques. 6. For how many years prior to 1868, as near as you can recollect?

Ans. 6. Well, I could not tell; it may have been a year, or two years, or more.

Ques. 7. Please look at the dies Exhibits 6, 7, and 8, and state if you recognize them, or any of them, as having been used at the foundry of Josiah Wilcox.

Ans. 7. I do recognize them all.

Ques. 8. Do you recollect whether or not they were used in the forming and bending of king bolts at his place, and during what years were they so used, as near as you can remember?

Ans. 8. Well, I could not state the years; I remember they used them during the war.

Ques. 9. Please state whether or not in the manufacture of king bolts prior to 1868, at Mr. Wilcox's place, there was any fuller or upper die used in connection with the dies 7 and 8.

Ans. 9. There was a fuller.

Ques. 10. And what was its purpose?

Ans. 10. For upsetting and spreading the stock of the bolt at the base of the clips.

Ques. 11. What do you mean by upset?

75 Ans. 11. Running the stock down on to the die Exhibits 7 and 8.

Ques. 12. State whether or not the king bolt was both bent and formed by the die- 7 and 8 at Mr. Wilcox's place.

Ans. 12. They were.

Ques. 13. Prior to being put through the dies 7 and 8, state whether or not the unfinished bolt was subjected to any operation by dies or hammer or otherwise.

Ans. 13. It was not, except hammered a little, and then split with a chisel. It was a piece of square iron, and then drawn a little on the end, split with a chisel, and upset in this die, Exhibit 7.

Ques. 14. Please state whether or not the bolt was subjected to any further operation by dies, or otherwise, after it came out of the die- 7 and 8.

Ans. 14. The king bolt was put on the corner of the anvil; a swedge was used on the clips of the king bolt for rounding and smoothing the clips, also to spread the clips.

Ques. 15. Please look at the king bolts accompanying the dies 6, 7, and 8, and state if you recognize them, or any of them, as having been made in the foundry of Josiah Wilcox prior to 1868, upon the dies Exhibits 6, 7, and 8.

Ans. 15. I recognize No. 6 as having been swedged in Exhibit No. 6; I recognize No. 7 as having been made on die Exhibit No. 7.

SAMUEL K. WILCOX.

76 Subscribed and sworn to before me, this 6th day of August, 1880.

JOHN A. SHIELDS,
U. S. Commissioner for the Southern District of New York, and Special Examiner.

(Cross-examination waived.)

ALEXANDER GANUNG, a witness called on behalf of the defendant, being first duly sworn, testifies as follows:

By Mr. FENTON:

Ques. 1. Please state your name, age, residence, and occupation.

Ans. 1. I am 39 years of age; residence, Portchester, New York; occupation, blacksmith.

Ques. 2. Have you at any time been in the employ of Josiah Wilcox, of Portchester?

Ans. 2. Yes, sir.

Ques. 3. How long have you been in his employ?

Ans. 3. A little over seventeen years.

Ques. 4. Still there?

Ans. 4. Yes, sir.

Ques. 5. What were your duties there prior to 1868, and what are your duties there now?

Ans. 5. Forging these king bolts.

Ques. 6. Will you please look at the Exhibits 7 and 8, and state if you recognize either of these dies as having been used at the factory of Josiah Wilcox prior to 1868?

77 Ans. 6. I recognize No. 7 and one similiar to No. 8.

Ques. 7. Did you personally use either of those in the forging of the bolts?

Ans. 7. Yes, sir.

Ques. 8. Look at the two king bolts accompanying Exhibits 7 and 8, and state if you recognize them, or either of them, as having been made on these dies.

Ans. 8. I do, on No. 7.

Ques. 9. After the iron bar was split to form the bolt was it subjected to any other operation prior to being put through the die 7 and 8?

Ans. 9. No, sir.

Ques. 10. After the bolt had passed through the die 7 and 8 was itsubjected to any other operation?

Ans. 10. No, sir.

Ques. 11. Did you operate the die 7 and 8 by means of steam or water power, as wellas by hand or foot?

Ans. 11. No, sir.

Ques. 12. Do you now use a drop?

Ans. 12. Yes, sir.

Ques. 13. Please state whether or not, in connection with the die 7 and 8, any upper die or fuller was used to bend the clip of the bolt.

Ans. 13. We used a fuller.

Ques. 14. Was the operation of the dies in any manner different when operated by hand or by means of the drop?

Ans. 14. Yes, sir; I think it was.

Ques. 15. How different?

Ans. 15. The die when used in a drop is a solid die.

78 Ques. 16. Then you did not use the die 7 and 8 in the drop. Is that so?

Ans. 16. No, sir.

Ques. 17. Is there any difference in the solid die now used by you and the die 7 and 8, other than the latter being in two parts?

Ans. 17. No, except that in the solid die it is rounded out here, where the clip comes.

ALEXANDER GANUNG.

Subscribed and sworn to before me, this 6th day of August, 1880.

JOHN A. SHIELDS,
U. S. Commissioner of the Southern District of New York, and Special Examiner, &c.

(Cross-examination waived.)

JOHN GREEN, a witness called on behalf of defendant, being first duly sworn, testifies as follows:

By Mr. FENTON:

Ques. 1. Please state your name, age, residence, and occupation.

Ans. 1. Age, 42; residence, Portchester, New York; occupation, blacksmith.

Ques. 2. Are you at present in the employ of Josiah Wilcox, of Portchester.

Ans. 2. I am.

79 Ques. 3. How long have you been in his employ, and what have been your duties there?

Ans. 3. I am in his employ, and have been for twenty-five years, and my duties there are making tools.

Ques. 4. Please look at Exhibits Nos. 6, 7, and 8 and state if you recognize those, or any of them, as having been used at Josiah Wilcox's place?

Ans. 4. I do recognize them.

Ques. 5. Please look at the king bolts accompanying these exhibits and state if you recognize them, or any of them, as having been made on those dies.

Ans. 5. I do, all of them.

Ques. 6. Please state whether or not any fuller or upper die was used at Wilcox's place prior to 1868 in connection with the dies 7 and 8.

Ans. 6. There was an upper die.

Ques. 7. Please state whether or not the dies 7 and 8, in connection with the fuller or upper die, both formed and bent the bolt.

(Objected to, as leading.)

Ans. 7. Yes, sir; they did.

Ques. 8. Was the bolt subjected to any other operation by means of dies, or otherwise, before or after being put through the dies 7 and 8?

Ans. 8. Afterwards the bolt was set on an anvil and the clip was swedged; that is, the clip was rounded by a swedge.

JOHN GREEN.

80 Subscribed and sworn to before me, this 6th day of August, 1880.

JOHN A. SHIELDS,
U. S. Commissioner for the Southern District of New York and Special Examiner, &c.

(Cross-examination waived.)

FRANKLIN M. WILCOX, a witness called on behalf of the defendant, being first duly sworn, testifies as follows:

By Mr. FENTON:

Ques. 1. What is your name, age, residence, and occupation?

Ans. 1. 33; residence, Portchester; occupation, blacksmith.

Ques. 2. Are you now in the employ of Josiah Wilcox, of Portchester, New York?

Ans. 2. Yes, sir.

Ques. 3. How long have you been in his employ?

Ans. 3. Between sixteen and seventeen years.

Ques. 4. Please look at the Exhibits Nos. 7 and 8, and the king bolt accompanying them, and state if you recognize that bolt as a sample of bolts made at his place, and if you recognize the dies, or either of them, as having been used at his place prior to 1868.

Ans. 4. I do; I recognize the dies and the bolts.

Ques. 5. Was the bolt subjected to any operation by dies or otherwise after it left the die 7 and 8?

Ans. 5. No, sir; not the clip part.

Ques. 6. Did any part, the question is?

81 Ans. 6. The bolt part or shank was milled or smoothed off.

Ques. 7. Was or was not any die used to form and bend the bolt other than the die 7 and 8 in connection with the fuller or upper die?

Ans. 7. No, sir.

Ques. 8. At Wilcox's foundry, between the years 1863 and 1868, did or did not the die 7 and 8, in conjunction with the fuller or upper die, perform the double function of bending and forming the king bolt?

Ans. 8. Yes, sir; they did.

Cross-examined by Mr. INGERSOLL:

X Ques. 1. Do you mean to say that the king bolts were sent to market just as they came from these dies, except that the shanks were milled, as shown by the sample No. 7?

Ans. 1. Yes, sir.

FRANKLIN N. WILCOX.

Subscribed and sworn to before me, this 6th day of August, 1880.

JOHN A. SHIELDS,
U. S. Commissioner for the Southern District of New York and Special Examiner, &c.

DANIEL F. SOUTHWICK, a witness called on behalf of the defendant, being first duly sworn, testifies as follows:

By Mr. FENTON:

Ques. 1. Please state your name, age, residence, and occu-

82 pation?

Ans. 1. Daniel F. Southwick; 47 years old; manufacturer; reside in Meriden, Connecticut.

Ques. 2. Are you at present an officer of The Beecher Manufacturing Company, the defendant here, and how long have you been connected with the company?

Ans. 2. I am an officer, and have been connected with the company eight years.

Ques. 3. Does your company manufacture clip king bolts for carriages, and how long have they manufactured such, and can you produce a sample of the bolts made by your company?

Ans. 3. About six years they have manfactured them; I can and do now produce a sample, marked Defendant's Exhibit No. 10.

Ques. 4. State whether or not all the clip king bolts manufactured by your company during the past six years are substantially similar in form and configuration to this Exhibit No. 10.

Ans. 4. Yes, sir; I think they are identical; they may have changed a little; nothing special.

Ques. 5. Have you read the letters patent in suit in this case, being reissue No. 8694, dated May 6, 1879, and do you understand the same?

Ans. 5. I have, and I think I understand the same.

Ques. 6. Can you produce a sample of a clip king bolt manufactured by the Atwater Manufacturing Company or any other of the plaintiffs in this case?

Ans. 6. I can, and now produce it; I think this is one made by J. B. Savage.

83 (Produced and marked Exhibit No. 11.)

Ques. 7. In the manufacture of king bolts by your corporation do you or have you used any dies such as shown in figure 5 of the said reissue patent and claimed in the first claim thereof?

(The reissue patent is shown the witness.)

Ans. 7. We do not, nor have not.

Ques. 8. In the manufacture of clip king bolts has your company at any time used any die so shaped as to form arms or flanges as shown in Exhibit No. 10 and figure 4 of the drawing of the patent at A 1 of said figure?

Ans. 8. We have not.

Ques. 9. Has your company ever at any time made or used any dies for forming clip king bolts, the lower die of which is similar to the lower die in Figure 5?

Ans. 9. We have not.

Ques. 10. Has your company at any time ever made or used any dies for forming clip king bolts, the upper die of which is plain, as in Figure 5?

Ans. 10. We have not.

Ques. 11. Has your company at any time ever made or used dies for forming clip king bolts, as shown in Figure 6 of the reissue patent?

Ans. 11. We have not.

Ques. 12. Please look at Defendant's Exhibit 1 and state if it cor-

rectly represents the dies used by your company for forming the head of the bolt and shaping the position of the clip arms.

84 Ans. 12. It does.

Ques. 13. What knowledge have you as to the extent of the manufacture of clip king bolts in the United States prior to the year 1869? I desire by this question to know whether one or more manufacturers, and how many, made such bolts prior to that year.

Ans. 13. I have a general knowledge. I think that Josiah Wilcox and Henry D. Smith did. I am sure those two parties made them previous to 1869. I don't think Savage did, or rather was a general manufacturer of them before 1869, although I am not certain about it.

Ques. 14. Are you acquainted with F. B. Morse, of Plantsville, Connecticut; and, if so, state whether or not you know if he is alive or dead.

Ans. 14. I was not acquainted with him personally, but he is not alive—he is dead. I think he died in 1871 or 1872. He has been dead several years.

Ques. 15. Can you identify the trade circular which I now show you of H. D. Smith & Co. of 1868?

Ans. 15. I can.

(Circular offered in evidence, marked Exhibit No. 12, of this date. Mr. Fenton states that it is offered to show that clip king bolts were well known to the trade prior to the plaintiffs' patent, independent of the mode of their manufacture.)

Ques. 16. Do you know William Beach, who was examined

85 by the complainants in this case?

Ans. 16. I do.

Ques. 17. What were his duties while in the employ of your company?

Ans. 17. He worked on different kinds of work.

Ques. 18. I mean with respect to the manufacture of king bolts.

Ans. 18. I think for a little while he performed the operation of splitting that iron. I think that is the only work he ever did.

Ques. 19. Did he ever, as far as you know, do any other work in respect to the manufacture of bolts in the company's works?

Ans. 19. I think not.

Cross-examination by Mr. INGERSOLL:

X Ques. 1. What has your position been in the defendant company?

Ans. 1. I have been secretary and general manager.

X Ques. 2. What knowledge have you that Exhibit No. 10 was made by the defendant company?

Ans. 2. I know from the general form of the bolt, and also I am pretty sure I placed that ticket (referring to ticket on exhibit) on there myself. I got it in our factory.

X Ques. 3. And when was it made?

Ans. 3. I should think within a year, perhaps, or a year and a half.

X Ques. 4. Since this suit was brought?

Ans. 4. I could not say positively about that, sir.

86 X Ques. 5. Did you superintend its making?

Ans. 5. Yes, sir; in a general way.

X Ques. 6. Did you see it made?

Ans. 6. I presume I did not see that particular bolt made. I might have done so, and I might not have done so.

X Ques. 7. Now, will you describe the process of making this bolt in your factory, beginning with the bar or rod of iron?

(Mr. Fenton objects to the question, because in its general form it is entirely irrelevant.)

Ans. 7. We cut the iron in pieces, split it sufficiently far down to make those clips, then flatten them by means of dies; trim them; round the collar on the shank under the hammer, and place them in clamping dies and strike them in a drop; afterwards take them from there and finish the stem in a hammer.

X Ques. 8. When the clip comes from what you call the dies that flatten it, in what shape is it?

Ans. 8. I think these clips stand a little up from right angles with the shank (as in Exhibit 5).

X Ques. 9. Then they are trimmed, are they?

Ans. 9. Yes, sir.

X Ques. 10. Is the shape at all affected by that operation?

Ans. 10. Yes, sir.

X Ques. 11. In what way?

Ans. 11. It takes off the surplus stock; what we call the wings or flanges. It is uneven, and we have to trim it.

X Ques. 12. That is the only effect?

Ans. 12. Yes, sir; I think so.

87 X Ques. 13. The clip is not turned by that operation from the right-angled position, which you have just described?

Ans. 13. Not very much, I should think. The punch may push it up a little; it is not intended to.

X Ques. 14. After it is trimmed, how many sets of dies does it pass through in order to make the perfect bolt?

Ans. 14. Two sets, I think, sir, or three—three sets, I guess.

X Ques. 15. To make the bolt as shown by Exhibit 10?

Ans. 15. I should think about three dies, sir.

X Ques. 16. This is after the trimming?

Ans. 16. It is three sets of dies.

X Ques. 17. What is the object of the first of those three sets of dies?

Ans. 17. To make a collar on the bolts.

X Ques. 18. The collar, then, is made before the clip is bent, is it?

Ans. 18. Yes, sir.

X Ques. 19. What is the object of the second of those three sets of dies?

Ans. 19. To form the clip.

X Ques. 20. And what of the third?

Ans. 20. To finish the stem in water. There is a die the length

of that stem you hold in you hands—to shape the whole length of that.

X Ques. 21. Will you please produce, before the testimony is closed on the part of the defendant, the set or series of the dies which you have just described as being used in the manufacture of bolts like Exhibit 10?

88 (Mr. Fenton, counsel for the respondent, instructs the witness to decline to produce such a set, for the reason that the process of manufacture of this character of goods is a trade secret in each and every establishment that manufactures the bolts and that class of goods; and for the additional reason that the witness has plainly, distinctly, and unqualifiedly stated that the defendants do not and have not at any time used any dies substantially similar in whole or in part, as respects the forms patented, to the dies shown and described and claimed in the reissue letters patent in suit.)

Ans. 21. Under instructions of counsel, I decline to do so.

X Ques. 22. Is there anything in your process of making king bolts that you have not already in your testimony described?

Ans. 22. I think not, sir.

X Ques. 23. Will you permit an expert on the part of the complainant to examine in your factory the dies and their operation, to which you have testified as in use by the defendant in the manufacture of such king bolts as Exhibit 10?

(Mr. Fenton objects to the question and to the request, for the reasons assigned to the previous question, and instructs the witness to decline.)

Ans. 23. Under the instruction of counsel, I decline.

Redirect by Mr. FENTON:

R. D. Ques. 1. Do you consider that it would be good business policy and safe to permit rival manufacturers, or any one
89 in their employ, to examine the details of your manufacture of king bolts?

Ans. 1. I do not.

R. D. Ques. 2. Is it not true, in whole or in part, as stated in my objection, that the minor details of the manufacture of king bolts is kept secret by those in the trade?

Ans. 2. It is.

R. D. Ques. 3. And is it not so kept secret for the reasons that I have stated in the previous question?

Ans. 3. It is, sir.

R. D. Ques. 4. You have stated, on cross-examination, that the arms of the clip were formed by a die in two parts after the collar was formed in a separate previous die; is that die which forms the arms of the clip in your establishment correctly represented in Exhibit 1?

Ans. 4. It is.

D. F. SOUTHWICK.

Sworn and subscribed before me, this 5th day of November, A. D. 1880.

JOHN A. SHIELDS,
U. S. Commissioner, &c.

Adjourned to a day to be fixed by counsel.

90 Circuit Court of the United States, District of Connecticut.

THE ATWATER MANUFACTURING COMPANY *et al.*
vs.
THE BEECHER MANUFACTURING COMPANY.

Proofs taken on behalf of defendant, under and pursuant to the 67th rule of the Supreme Court of the United States, in equity, as amended, before Oscar R. Myers, a notary public of the State of Pennsylvania, at the city of Philadelphia, pursuant to notice, and with the same effect as if taken before an examiner by consent of the parties.

Present: Charles R. Ingersoll, Esq., Geo. S. Prindle, Esq., counsel for complainants, and H. T. Fenton, Esq., counsel for defendants.

WILLIAM B. MCELNEY, a witness produced on behalf of the defendant, being duly sworn, answers as follows:

Ques. 1. What is your name, residence, age, and occupation?

Ans. 1. William B. McElney; age, 34; occupation, machinist; residence Meriden, Connecticut.

Ques. 2. Have you ever had any experience, and, if so, to what extent, in the manufacture or assisting in the manufacture of clip king bolts, or dies for making the same?

Ans. 2. I have. I have had charge of Beecher Manufacturing Company about six years, and am there still. Prior to that six years I worked for H. D. Smith & Co., Plantsville, Conn. I worked for them two years; part of '67, '68, and part of '69.

91 Ques. 2. While engaged with H. D. Smith & Co., did you, or did you not, assist in the manufacture of clip king bolts for carriages?

Ans. 2. I did.

Ques. 3. Will you please look at Defendant's Exhibit 12, and state whether you recognize it as the trade circular of H D. Smith & Co., of 1868, and whether, or not, you recognize the bolt on page 21 as the bolt then made by them?

Ans. 3. I recognize the bolt then made by them. I don't recognize the trade circular; I don't know as I ever saw one.

Ques. 4. Were you at any time acquainted with one F. B. Morse, late of Plantsville, Connecticut?

Ans. 4. I was.

Ques. 5. Is he now living, or deceased?

Ans. 5. He is deceased.

Ques. 6. When did he die?

Ans. 6. Six or seven years ago.

Ques. 7. Was he at any time to your knowledge in the employ of H. D. Smith & Co., of Plantsville, Connecticut?

Ans. 7. He was.

Ques. 8. While in their employ did he, or not, assist in the manufacture of clip king bolts by means of the dies patented to him by letters patent 96251, dated Oct. 26, '69, immediately prior to and at the time of the issuing of that patent to him?

(The witness is shown Morse's patent Exhibit No. 5.)

92 Ans. 8. That is the dies that he used at Smith's immediately prior to and at the time of the issuing of that patent to him.

Ques. 9. Can you say whether or not H. D. Smith & Co. made use of dies in the manufacture of clip king bolts before they used the Morse dies shown in that patent?

Ans. 9. They did.

Ques. 10. Can you say how long before?

Ans. 10. Two years.

Ques. 11. State whether or not the bolts made by H. D. Smith & Co. on the Morse dies, in 1869, were all like the Exhibit No. 12; or were any of them like the flange bolt in the plaintiff's patent now shown you?

Ans. 11. They were all like that shown in Exhibit No. 12, and not like that in plaintiff's patent.

Ques. 12. Did or did not the difference between them consist only in the wings or flanges at A^1 of Fig. 4 of plaintiff's patent.

(Objected to by plaintiff's counsel, as leading.)

Ans. 12. That was all the difference.

Ques. 13. Were or were not the bolts made by H. D. Smith & Co. in '67, '68, and '69 substantially similar to the clip king bolt now shown you (witness shown Exhibit No. 10)?

(Objected to by plaintiff's counsel, as leading.)

Ans. 13. Yes.

Ques. 14. Please look at the king bolt, Defendant's Exhibit No. 10, and say whether or not it truly represents the king bolts manufactured by the defendant.

93 Ans. 14. It does.

Ques. 15. Please look at Defendant's Exhibit No. 11, being a specimen of plaintiff's bolt, and say whether or not the Beecher Manufacturing Company, now or at any time since you have been in their employ, have made any flange clip king bolts similar to this exhibit.

Ans. 15. They have not.

Ques. 16. Please look at plaintiff's reissued patent now shown you, and state whether or not the Beecher Manufacturing Company, now or at any time since you have been in their employ, have used any dies substantially similar to the dies therein described and shown in the drawings.

Ans. 16. They have not.

Ques. 17. Has it or not been part of your business to make the dies?

Ans. 17. It has.

Ques. 18. Will you please look at Fig. 5 of plaintiff's reissued patent, and state whether or not the recess, small "*b*" in the die Fig. 5, is or is not essential in the formation of the wings or flanges of the king bolt, Exhibit No. 11?

Ans. 18. I don't think it is.

Ques. 19. What is the object of the recesses small *b*, Fig. 5, of the plaintiff's reissued patent?

Ans. 19. It is to form the flanges of Exhibit 11, I suppose.

Ques. 20. Please look at the specimen Exhibit No. 9 now shown you, and state whether or not it resembles in any respect the split rod of iron used in forming the bolt at H. D. Smith & Co.'s while you were in their employ.

Ans. 20. It does.

94 Ques. 21. Does it or not differ in any respect?

Ans. 21. It does not.

Ques. 22. Does it or not represent the split rod of iron used in forming the bolt at the Beecher Company's works?

(Objected to, as leading.)

Ans. 22. It does.

Ques. 23. Please look at the drawing now shown you, and marked Defendant's Exhibit No. 13, and state wherein it differs, if at all, from the welding dies used by the Beecher Manufacturing Company now and since you have been in their employ.

Ans. 23. That is the same die we used.

Ques. 24. Please look at the drawing, Defendant's Exhibit No. 1, and state if it truly represents the bending dies now and heretofore used at the Beecher Company's works.

Ans. 24. It does.

Ques. 25. In the manufacture of king bolts at the Beecher works, is or is it not the dies shown in Exhibit 13 the first set of dies to which the blank is subjected?

(Objected to, as leading.)

Ans. 25. It is.

Ques. 26. After the blank is taken from these dies, what process is it put through before reaching the bending die shown in Exhibit No. 1?

Ans. 26. It is trimmed in the trimming die, collar and stem is drawn out and hammered by trip-hammer dies.

95 Ques. 27. Please look at the dies, Fig. 6 of plaintiffs' reissued patent, and state whether or not the bolt could have been therein bent if the collar had been previously formed on it on the trip-hammer dies.

Ans. 27. It could not.

Ques. 28. Why not?

Ans. 28. Because Fig. 6 being a solid die it would be utterly impossible to get bolt, Fig. 11, in there.

Ques. 29. Please look at drawing, Defendant's Exhibit No. 1, and state whether or not it represents a solid die made to form a bolt before the collar is put on, or whether it represents a die made in sections to form a bolt on which the collar had been previously formed.

Ans. 29. It represents a die made in sections to bend a bolt on which the collar had been previously formed.

Ques. 30. Please look at the drawing marked Exhibit No. 14, and state whether or not it represents the trip-hammer dies for forming the collar used at defendant's works, and referred to by you in your previous answers.

Ans. 30. It does.

Cross-examined by C. R. INGERSOLL, Esq.:

X Ques. 31. Do you mean to be understood that the Beecher Company, during your connection with them, have at no time used in the manufacture of king bolts any other dies than those they now use?

Ans. 31. They have not.

X Ques. 32. Do you mean to be understood that during this period the only dies which they have used in the manu-
96 facture of king bolts are the three sets of dies represented by the respective drawings, Exhibits 1, 13, and 14?

Ans. 32. No, sir; they are not.

X Ques. 33. Will you please have made and present drawings of such other dies as they have so used?

(Objected to, because improper to put upon witness the trouble and expense of preparing drawings of other two dies, to wit, trimming and finishing dies, which have no connection with this case.)

Ans. 33. Mr. Fenton has drawings of the trimming and finishing dies.

WM. B. McELNEY.

Sworn and subscribed before me, this ninth day of September, A. D. eighteen hundred and eighty.

OSCAR R. MEYERS,
Notary Public.

BARTON H. JENKS, a witness called on behalf of the defendant, being duly sworn, answers as follows:

Ques. 1. Please state your name, age, residence, and occupation.

Ans. 1. Barton H. Jenks; 51 years of age; Philadelphia; mechanical engineer.

Ques. 2. Have you ever been called upon to testify as an expert concerning the subject-matter of letters patent for inventions which have been made the subject of issues or inquiries in the United States courts?

97 Ans. 2. I have, a great many times.

Ques. 3. What experience, if any, have you had in the manufacture and use of dies for forming metal shapes?

Ans. 3. My experience has been very large in that direction, having been the owner of a large manufacturing establishment in the city of Philadelphia; having worked directly at the business under a father's tuition both on forging dies and forming tins and metals since the year 1845, and having established at that place, in 1862, the manufacture of Springfield rifle muskets for the Government to the extent of over a hundred thousand stand of arms. Most of the dies in the smith shop were designed by myself, put into use and worked in the smith shop, where there were employed over eighty men; these dies were for forging and forming the various parts of the muskets, to wit, lock plates, with all the details of the lock, butt plates, bands, ramrods, screws, and all the other parts of the musket.

Ques. 4. Have you, at my request, read and examined both the original and the reissued letters patent and the file and contents, the applications for those patents being Exhibits Nos. 2 and 3 and 4 of defendant, and Exhibit A of plaintiffs, and do you understand the same?

Ans. 4. I have examined the above papers and understand them.

Ques. 5. Have you also, at my request, examined defendant's Exhibit No. 5, being patent to F. B. Morse, and do you understand the same?

Ans. 5. I have examined it and understand it.

Ques. 6. Have you also examined the several drawings illustrating the dies used by the defendants for welding bolt
98 blank, turning the collar thereon, and forming the bolt, being Exhibits Nos. 1, 13, and 14, and do you understand from them the making of a king bolt therewith?

Ans. 6. I have examined those drawings and understand the making of a king bolt thereby.

Ques. 7. Please look at the bolt, Defendant's Exhibit No. 10, and state whether or not the dies, Exhibits 1, 13, and 14, would necessarily produce from the split rod, Exhibit 9, a king bolt of the shape and configuration of Exhibit 10. In answering this question you may leave out of consideration any minor process of trimming off fins or drawing out the stem.

Ans. 7. They would necessarily form the king bolt, Exhibit 10, and even draw the shank out, forming the bolt precisely as Exhibit No. 10, excepting the trimming.

Ques. 8. If the split rod, Exhibit 9, was subjected to the dies shown in the plaintiffs' reissued patent, would or would not the resultant bolt necessarily present the form and configuration of the bolt, Exhibit No. 11?

Ans. 8. It would necessarily produce that shape bolt with additional dies to form the collar and shank, as well as trimming off the fins.

Ques. 9. Please look at the two bolts, Exhibits Nos. 10 and 11, and state whether or not the addition of wings or flanges in the one, No. 11, and the absence of wings or flanges in the other, No. 10, make them materially and substantially different.

Ans. 9. They are materially and substantially different in con-

figuration, and could not be made in same set of dies as to those dimensions.

99 Ques. 10. So far as you have been able to learn from any publications or patents, say whether or not the wings or flanges are put upon the bolt to accomplish any particular purpose in the use to which the bolt is applied.

Ans. 10. I have somewhat examined the state of the art as to king bolts, and find the wings or flanges the subject of an especial patent of James Phelps, No. 59642, patented Nov. 13, 1866.

(Defendant's counsel offers in evidence the letters patent of James Phelps, referred to by witness, and the file and contents of application thereof, marked Defendant's Exhibit 15.)

Ques. 11. Please look at this patent Exhibit 15, and the plaintiffs' original and reissued patents, and state whether or not, in your opinion, from an examination of the plaintiffs patent and the file and contents of application therefor, it was the express design of the patentee to make a die to produce a bolt having the wings or flanges shown in the Phelps patent, Exhibit No. 15.

Ans. 11. I have examined these papers, and, in my opinion, the purpose and object of Mr. Miller was to produce a king bolt the same as Mr. Phelps', having the wings or flanges.

Ques. 12. From an examination of the plaintiffs' reissued patent, and the file and contents of application therefor, are you or not of opinion that the first claim thereof was intended to cover any die or pair of dies other than the dies therein expressly described, to wit, a plain-faced upper die C, in combination with a lower die,

100 having the transverse groove "*b*" and the recesses C designed expressly to form a bolt with wings or flanges like Exhibit No. 11?

Ans. 12. It is my decided opinion that in Miller's reissued patent of May 6, '79, the dies claimed in his first claim, to wit, the die B, *b* and b^1 and the die C was constructed expressly for forming a king bolt with the wings or flanges, as the recess *b* is formed for gathering in by swedging sufficient metal out of which to form the wings or flanges, and that they were designed expressly for that object and purpose.

Ques. 13. Is it or not your opinion that the first claim of the plaintiff's reissued patent is to be confined to an upper and lower die expressly as constructed, as shown in Fig. 5 of the patent?

Ans. 13. It is my decided opinion that it was so to be confined to the die set forth and shown.

Ques. 14. Please look at the plaintiff's reissued patent and the original patent and file of each, and state whether or not, in your opinion, the claims, or either of them, cover more and other matter not shown or described in the said original patent or the application therefor.

Ans. 14. The reissued patent claims more than the original, in that it omits the disclaimer in the prior patent of either of the dies herein described separately, and inserts in the claim series of dies,

thus confining the claim to a series instead of to any particular die separately.

Ques. 15. Please look at the drawing, Exhibit No. 1, and state whether or not, in your opinion as an expert in the manufacture and use of dies, a sectional die to bend the bolt after the collar
101 has been formed thereon, is or is not the same substantially as the solid die shown in Fig. 6 of plaintiff's reissued patent, and state your reasons for any answers you may give.

Ans. 15. It is substantially different, the lower die being in two sections, it can be opened to receive the clip bolt, and when closed embraces the collar and portion of the shank, which resist the force of the impingement of the falling of the top die to set the arm into position, whereas, in the Miller die, being solid, it would be impossible to enter the king bolt with the collar and then impinge upon it with the falling die without destroying the shape of the wings or flanges.

Ques. 16. Please look at the drawing, Exhibit No. 13, and state whether or not it is substantially different and intended to form an entirely different shape resultant bolt from the pair of dies shown in Fig. 5 of plaintiff's reissued patent.

Ans. 16. It is entirely different in construction and design to produce an entirely different king bolt, as in the dies in Exhibit 13, there is a projection on the under side of the top or falling die, and a corresponding depression in the bottom or anviled die; this projection and corresponding depression designed to thin the metal at the bottom, between the arms of the king bolt; whereas the Miller one gathers the metal into the recess *b* out of which to form the wings or flanges, as heretofore described, causing, of necessity, an entirely different product.

Ques. 17. Please look at the letters patent to F. B. Morse, Defendant's Exhibit No. 5, and state if you do not find therein shown and described a set or series of dies for forming king bolts, the
102 first set being a pair of welding dies, and the last set being a pair of forming dies, in which latter the bolt is bent after the collar has been previously formed thereon.

Ans. 17. I find it so, as stated in the question.

Ques. 18. Is it or not your opinion that the forming dies must necessarily be different in their construction and operation, where, in the one case, the collar of the bolt has been previously formed, and, in the other case, it is intended to be afterwards formed?

Ans. 18. They must be entirely different.

Ques. 19. Please state whether or not the principle of construction and mode of operation of any set or series of welding or bending and forming dies for king bolts would be affected or controlled by the use in addition thereto of trimming dies for trimming the fins, and of finishing dies for drawing out the stem.

Ans. 19. It would not be affected or controlled by the processes mentioned.

(No cross-examination.)

BARTON H. JENKS.

Sworn and subscribed before me, this ninth day of September, A. D. 1880.

OSCAR R. MEYERS,
Notary Public.

Defendant's counsel offer in evidence certified copy of file and contents of letters patent granted to F. B. Morse, dated Oct. 26, 1869, No. 96251, marked Defendant's Exhibit 16.

103 Defendant's close, reserving the right to call as witnesses Messrs. W. W. Knowles and W. Mason.

Adjourned to meet Sept. 17, 1880, at 10 a. m., at New Haven.

Circuit Court of the United States, District of Connecticut. In Equity.

THE ATWATER MANUFACTURING COMPANY *et al.*
vs.
THE BEECHER MANUFACTURING COMPANY.

Proofs taken on behalf of the defendant under and pursuant to the 67th rule of the Supreme Court of the United States, in equity, as amended, before Francis G. Ingersoll, notary public for the State of Connecticut, and at the city of New Haven, pursuant to notice, and, with the same effect as if taken before an examiner, by consent of parties.

Present: Geo. S. Prindle, Esq., and C. R. Ingersoll, Esq., counsel for complainants, and O. H. Platt, Esq., of counsel for defendant.

WILSON W. KNOWLES, a witness produced by and on behalf of the defendant, being duly cautioned and sworn, answers to questions proposed by O. H. PLATT, Esq., as follows:

Ques. 1. What is your name, age, residence, and occupation?

104 Ans. 1. 45; Southington; mechanic—blacksmith; Wilson W. Knowles.

Ques. 2. Have you ever had any experience, and, if so, to what extent, in the manufacture, or assisting in the manufacture, of clip king bolts, or of dies for making the same?

Ans. 2. I have, about fourteen years, at H. D. Smith & Company's, Atwater Manufacturing Company's, Clark Bros. & Company's.

Ques. 3. While engaged with H. D. Smith & Company did you or not assist in the manufacture of clip king bolts for carriages?

Ans. 3. I did.

Ques. 4. At what period were you working for H. D. Smith & Co.?

Ans. 4. From 1860 to 1869.

Ques. 5. Will you please look at "Defendant's Exhibit 12" and state whether you recognize it as the trade circular of H. D. Smith & Co. of 1868, and whether you recognize the bolt on page 21 as the bolt then made by them?

Ans. 5. I do.

Ques. 6. Were you at any time acquainted with one F. B. Morse, late of Plantsville, Conn.?

Ans. 6. I was.

Ques. 7. Is he now living or deceased?

Ans. 7. Deceased.

Ques. 8. When did he die?

Ans. 8. I should say in about 1872.

Ques. 9. Was he at any time, to your knowledge, in the employ of H. D. Smith & Co., of Plantsville, Conn.?

105 Ans. 9. He was.

Ques. 10. While in their employ did he or did he not assist in the manufacture of clip king bolts by means of the dies patented to him by letters patent 96251, dated Oct. 26th, 1869, immediately prior to and at the time of issuing of that patent to him?

(The witness is shown Morse's patent.)

(Objected to.)

Ans. 10. He did.

Ques. 11. Can you say whether H. D. Smith & Co. made use of dies in the manufacture of clip king bolts before they used the Morse dies shown in the patent?

Ans. 11. They did.

Ques. 12. How long before?

Ans. 12. I should judge four years.

Ques. 13. State whether or not the bolts made by H. D. Smith & Co. on the Morse dies in 1869 were all like the bolt in Exhibit No. 12, or were any of them like the flange bolt in the plaintiffs' patent now shown you?

(Objected to, as leading.)

Ans. 13. They were not like the bolt shown in Exhibit 12. They were like the flange bolt, or had projecting flanges.

Ques. 14. In what particular did the bolts made by H. D. Smith & Co. on the Morse dies in 1869 differ from the bolt shown in Exhibit 12?

Ans. 14. In the flange.

Ques. 15. And am I to understand or not that the bolts

106 made by H. D. Smith & Co. on the Morse dies in 1869 had the flange?

Ans. 15. It did.

Ques. 16. Please look at Exhibit No. 10, and state whether or not it is substantially similar to clip king bolts made by H. D. Smith & Co. from '65 to '69.

Ans. 16. It is.

Ques. 17. Please look at Fig. 5 of plaintiffs' reissued patent and state whether or not the recess *b* in the die, Fig. 5, is or is not essential to the formation of the wings or flanges of the king bolt, "Defendant's Exhibit No. 11."

Ans. 17. It is.

Ques. 18. Please look at the die, Fig. 6 of plaintiffs' reissue patent, and state if the bolt could have been therein bent if a collar

like that shown in Fig. 3 had been previously formed on it by trip-hammer dies.

Ans. 18. No, sir.

Cross-examination by C. R. INGERSOLL, of counsel for complainants:

X Ques. 19. Do you mean to be understood by your answer to question 16 that clip king bolts, such as Exhibit No. 10, were made for the market by H. D. Smith & Co. in the year 1865?

Ans. 19. I should say that they were.

X Ques. 20. Was R. R. Miller, the patentee, engaged with H. D. Smith & Co. from 1865 to 1869, or during any part of that period?

Ans. 20. He was. I couldn't say that he was during the
107 whole period; I should say from '65 to '68.

X Ques. 21. Were you a witness in the interference case between R. R. Miller and F. B. Morse respecting the invention which is the subject of plaintiffs' patent?

Ans. 21. I was.

X Ques. 22. Did you or not there testify that R. R. Miller was the first person within your knowledge to make by dies a clip king bolt, such as Exhibit No. 10?

Ans. 22. I don't think I did; I don't remember.

X Ques. 23. After the patent in question was issued to Miller, did you or not purchase of Miller an interest in the patent?

Ans. 23. I did.

X Ques. 24. Did H. D. Smith & Co. change their shop in which king bolts were manufactured during the period you have referred to; that is, from 1865 to 1869?

Ans. 24. No, sir.

X Ques. 25. When did they move to their new shop?

Ans. 25. I should think about 1861 or 1862, and they have remained in that shop ever since.

WILSON W. KNOWLES.

Sworn to before me—

FRANCIS G. INGERSOLL,
Notary Public.

The defendant here rests the case.

108 *Petition.*

To the Commissioner of Patents of the United States of America:

The petition of Rob't R. Miller, of Plantsville, in the county of Hartford, and State of Connecticut, respectfully represents:

That your petitioner has invented new and improved dies for forming king bolts for wagons, which he verily believes has not been known or used prior to the invention thereof by your petitioner. He therefore prays that letters patent of the United States of America may be granted to him therefor, vesting in him and his legal representatives the exclusive right to the same, upon the terms and conditions expressed in the act of Congress in that case made and pro-

vided; he having paid fifteen dollars into the Treasury of the United States, and otherwise complied with the requirements of said act. And he hereby authorizes O. D. Munn, S. H. Wales, and A. E. Beach, of the firm of Munn & Co., of the cities of New York and Washington, or their accredited agent, to act as his attorneys in presenting the application, and in making all such alterations and amendments as may be required, and to sign his name to the drawings.

R. R. MILLER.

[50. R. R. M. July 23, 1869. 50.]

"Revoked Nov. 12, '69, the new power of attorney now filed by—
"J. A. WINDERSHEIM."

109 *Oath.*

COUNTY OF HARTFORD, } ss:
State of Connecticut, }

On this twenty-third day of July, 1869, before the subscriber, a justice of the peace in and for said county, personally appeared the above-named Robert R. Miller, and made solemn oath that he verily believes himself to be the original and first inventor of the within-described improved dies for forming king bolts for wagons, and that he does not know or believe that the same was ever before known or used; and that he is a citizen of the United States.

THEO. F. LEWIS,
Justice of the Peace.

To all whom it may concern:

Be it known that I, Robert R. Miller, of Plantsville, in the county of Hartford, and State of Connecticut, have invented new and improved dies for forming king bolts for wagons, and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents the rough king bolt after being split and before being placed in the die.

Figure 2 is a longitudinal section of the die, by which the clip arms of the bolt are formed.

110 Figure 3 is a cross section of the same, taken through the line *x x*, figure 2.

Figure 4 is a cross section of the dies, by means of which the clip arms are bent into proper form, and the wings are formed.

Figure 5 is a longitudinal section of the same taken through the line *y y*, figure 4.

Figure 6 is a perspective view of the bolt when finished.

My invention has for its object to furnish an improved set of dies, by means of which the clip arms and wings of king bolts may be quickly, conveniently, and accurately formed.

And it consists in the series of dies constructed and operating as hereinafter more fully described.

A represents the die by which the clip arms are formed. The die

A is formed with a round hole, a^1, in its centre to receive the end of the round rod from which the upper part of the bolt is to be formed. From opposite sides of the central hole a^1 semi-cylindrical grooves, a^2, are formed, extending out for a suitable distance. One end of the rod from which the king bolt is to be formed is split for about one and a half or two inches, and the parts are turned down to about at right angles with the body of the said rod. This naturally forms a collection or thickening of metals at the angles or bends. The rod thus prepared is then placed in the die A and struck with a drop, forming the clip arms and forcing the surplus metal into the ring-like cavity, a^3, of the die A, around the hole a^1. The partially formed bolt is then removed from the die A and placed across the die B, the arms resting on the projections b^4.

The die B is formed with a hole, b^1, in its centre to receive
111 the part of the bolt which is to form the upper part or spindle.

From the opposite sides of the hole b^1, half round grooves, b^2, lead out for sufficient distances. Upon the upper side of the die B, upon the opposite sides of the hole b^1, are formed upwardly projecting lugs or flanges, b^4, upon the inner side of which are formed half round grooves to receive the shoulders of the clip arms of the bolt, and gives them the proper bend or form while the wings are being formed in the grooves b^2. The wings or lips are formed by pressing out the metal heretofore described as being pressed into the ring-like cavities, a^3 of the die A, into the grooves b^2 of the die B, by the die C, their size being limited by the capacity of the ring-like cavities a^3 and the consequent amount of metal to be forced into the grooves b^2, and their form being that which the said metal will naturally take when forced into the said grooves b^2 by the action of the said die C, as indicated at the point D, in figure 5. These wings, b^4, are shown in perspective in figure 6, sheet II", and in dotted lines in figure 5, sheet I.

C is the upper or movable die, the face of which is made semi-cylindrical in form to form the wings of the king bolt, and the sides of which are so formed as to press the clip arms into the grooves of the flanges b^4, and thus bend or form them into proper shape.

Having thus described my invention, "I wish it to be understood that I do not claim either of the dies herein described separately, but" I claim as new and desire to secure by letters patent—

The series of dies A, B, and C, for forming the clip arms and wings of the lower ends of king bolts for wagons, said
112 dies being constructed and operating substantially as herein shown and described.

R. R. MILLER.

Witnesses:
THOS. F. LEWIS.
H. R. BRADLEY.

U. S. PATENT OFFICE, WASHINGTON, D. C., *Aug.* 12, 1869.

ROBERT R. MILLER, care of Munn & Co., *Washington, D. C.:*

Please find below a communication from the examiner in relation

to your application for a patent for dies for forming king bolts, filed July 31, 1869.

Very respectfully, ——— ———, *Commissioner.*

EXAMINER'S ROOM, No. 6.

In the matter above referred to the application has been preliminarily examined. The article made is described as composed of a spindle, arms or clips, and wings. The method of producing the arms is understood, but the wings and the method of making them is not understood. The drawings and model show a spindle with arms, but not with wings. If the article made possess wings also, it should be so represented in the drawings and model, and, moreover, the source from which metal is derived to form such wings should be stated. The specification and drawings need amendment
in these particulars; a finished article should be furnished as
113 a sample, and the use and application of the article should be set forth.

WASHINGTON, D. C., *August 31st*, 1869.

Hon. S. S. FISHER, *Commissioner of Patents.*

SIR: I hereby amend the specification in my application for letters patent for dies for forming king bolts by inserting the following after the matter relating to "Fig. 5." on page 2: "Figure 6 is a perspective view of the bolt when finished."

Also by inserting the following after "grooves b^2," 4th page:

The wings or lips are formed by pressing out the metal heretofore described as being pressed into the ring-like cavities a^3 of the die A into the grooves b^2 of the die B by the die C, their size being limited by the capacity of the ring-like cavities a^3, and the consequent amount of metal to be forced into the grooves b^2, and their form being that which the said metal will naturally take when forced into the said grooves b^2 by the action of the said die C, as indicated at the point D in Figure 5. These wings, b^4, are shown in perspective in Figure 6, Sheet II″, and in dotted lines in Figure 5, Sheet I.

An "additional model and 'drawing'" are herewith filed.

ROBERT R. MILLER,
Per MUNN & CO., *Attorneys.*

114 (*Interference Cases.*)

DEPARTMENT OF THE INTERIOR, U. S. PATENT OFFICE,
WASHINGTON, D. C., *Oct. 9th*, 1869.

SIR: Please find below a communication concerning your application for a patent for improved dies for forming king bolts for wagons, filed the 31st day of July, 1869.

Very respectfully,

———— ———, *Commissioner.*

To ROBERT R. MILLER, care of Munn & Co., *Washington.*

EXAMINER'S ROOM, No. 6.

In the matter of the alleged invention above referred to, notice is hereby given to the applicants hereinafter named, that their claims are adjudged to interfere with each other, and that a hearing will be granted them on the 16th day of Dec., 1869, and that the testimony of the respective parties must be closed previous to the days hereinafter specifically designated, it being understood that the party first making the inventor's oath will be deemed the first inventor in the absence of proof to the contrary.

Rebutting testimony, but no other, may be taken after the closing of the testimony-in-chief, but the same must be closed previous to the 4th day of December, 1869.

All testimony must be taken, &c., in accordance with the printed rules herewith transmitted.

Applicant F. B. Morse, of Plantsville, Conn., will close his
115 testimony-in-chief on or before Nov. 6, 1869.

J. E. EARLE,
New Haven, Conn., Attorney.

Applicant Robert R. Miller, of Plantsville, Conn., will close his testimony-in-chief on or before the 20th day of Nov., 1869.

MUNN & CO.,
Washington, Attorneys.

Interference between Morse's 1st claim and so much of Miller's claim as refers to the dies B and C.

J. W. JAYNE, *Examiner.*

WASHINGTON, D. C., *November* 12, 1869.

SIR: In the matter of my application for letters patent for forming king bolts, please recognize John A. Windersheim, of Washington, D. C., as my true and lawful attorney.

I revoke the power of attorney granted to Munn & Co.

Very respectfully, your obedient servant,

R. R. MILLER.

Hon. S. S. FISHER, *Commissioner of Patents.*

[50-cent internal revenue stamp. Cancelled.]

WASHINGTON, D. C., *Feb.* 5, 1870.

SIR: I hereby amend the application of R. R. Miller for dies for forming king bolts as follows:

Page 3, line 2, insert "series of" before "dies."

Also insert before the claim:

"I wish it to be understood that I do not claim either of the dies herein described separately, but"

116 Also insert in the claim the words "series of" before "Dies."

Respectfully submitted,

JOHN A. WINDERSHEIM, *Attorney.*

Hon. S. S. FISHER, *Commissioner of Patents.*

U. S. PATENT OFFICE,
WASHINGTON, D. C., ——, 186–.

Robert R. Miller, Improved Series of Dies for Forming heads of King Bolts.

This is a series of dies adapted to form the head on a blank, consisting of a short round rod split at one end and the sections opened out. Die A is a block of metal with a groove across its face, intersected by a countersunk hole; die B is a block with a V shaped cavity, and with a groove down each wall of the cavity, terminating in a vertical hole in the block; die C is a wedge-like piece to cooperate with die B. The stem, or unsplit portion of the blank, is inserted in the hole in die A, and the sections of the split portion are forced down flat into the groove by a drop, after which the blank is placed with its arms across die B, and die C being brought down, forces the stem into the hole, and bends the arms into the form due to the grooves and the walls of the die.

117 115 1869.

3477

No. 100,053.

Robert R. Miller, ass'or to self and J. B. Savage, of Southington, Conn.

Of Plantsville.
County of Hartford.
State of Conn.

Dies for forming king bolts for wagons.

Rec'd July 31, 1869.
Petition, " " "
Affidavit, " " "
Specification, " " "
1. Drawing, " " "
Model, " " "
Cert. dep. " " "
1. Cash, $15, " 30, "
Add'l fee, cert.
1. " Cash, $20, Sept. 23, 1869.
Examined, Feb. 5, 1870. Jayne.
2. Issue, Grinnell, Feb. 7, 1870.
4. Patented, Feb. 22, 1870, X
Recorded, vol., — page —.
Circular, —, Sept. 16, 1869.

JOHN A. WINDERSHEIM, *Pres't.*

Reissued May 6, 1879. No. 8694.

118 Imp't series of dies for forming the heads of king bolts.

1869.

Aug. 12, 1869. Letter.
Sept. 14, " Passed for issue.
I. *a.* Oct. 9, 1869. "Interference" declared between claim of dies "B" and "C" and F. B. Morse's application, 1st claim.
I. *a.* Feb. 2, 1870. "Interference" "dissolved."
" 5, " Passed for issue.
Ex'd. L. M.
M. V.

Petition for Reissue of Letters Patent No. 100,053.

To the Commissioner of Patents:

The petition of Robert R. Miller, of Plantsville, in the county of Hartford and State of Connecticut, respectfully represents:

That your petitioner did obtain letters patent of the United States for certain improved series of dies for forming the heads of king bolts, bearing date of February 22d, 1870, which letters patent your petitioner believes to be inoperative and invalid by reason of a defective specification, which defect has arisen from inadvertence and mistake.

119 He therefore prays that he may be permitted to surrender said letters patent, and requests that new letters patent may be issued to his assignees for the said invention for the residue of the period for which the original patent was granted under the amended specification herewith presented, he having paid thirty dollars into the Treasury of the United States, in accordance with the requirements of the act of Congress in that case made and provided.

He further requests that Messrs. Prindle & Co., of Washington, D. C., may be recognized as his true and lawful attorneys, for him and in his name, to prosecute this application to a final decision.

R. R. MILLER.

We concur in the above petition.

J. B. SAVAGE.
ATWATER M'F'G CO.,
By M. N. WOODRUFF, *Pres.*

To all whom it may concern:

Be it known that I, Robert R. Miller, of Plantsville, in the county of Hartford and State of Connecticut, did invent certain new and useful improvements in "dies for forming the heads of king bolts," for which letters patent No. 100,053 were issued to me upon the 22d day of February, 1870, which letters patent have been found defective, in that the specification and claims do not cover all of the invention shown and described in the application filed by me upon the 31st day of July, A. D. 1869.

120 Now, therefore, being desirous of reissuing the said letters patent, I have prepared and do hereby declare the following to be a full, clear, and exact description of my said invention, reference being had to the accompanying drawings making a part of this specification, in which—

Figure 1 is a perspective view of the blank used in the formation of my king bolt.

Figure 2 is a like view of the same after passing through the forming dies.

Figure 3 is a perspective view of said blank after having been operated upon by the bending dies.

Figure 4 is a like view of the completed king bolt.

Figure 5 is a perspective view of the dies used for forming the clip arms, said dies being separated from each other.

Figure 6 is a like view of the dies used for bending said clip arms to shape.

Figure 7 is a central, longitudinal section of said forming dies as they appear when closed together with a clip blank within the lower die; and

Figures 8 and 9 are, respectively, longitudinal and cross sections of the bending dies, upon central lines, as they appear with the completed king bolt between their faces.

Letters of like name and kind refer to like parts in each of the figures.

The design of my invention is to enable clip king bolts to be easily and cheaply made by machinery, to which end—

121 Erased by am'd't, April 11, 1879. It consists, principally, in the blank used for constructing the king bolt, substantially as and for the purpose therein specified.

It consists, principally, in the forming dies constructed in the manner substantially as hereinafter shown.

Erased by am'd't, April 11, 1879, It consists, farther, in the bending dies constructed in the manner and for the purpose substantially as hereinafter set forth.

It consists, further [Am'd't, April 11, 1879], in the series of dies substantially as and for the purpose hereinafter shown and described.

In the construction of king bolts I employ a blank, A, which is formed by splitting the end of a metal bar longitudinally for a distance of about two inches, turning the forks or arms *a* outward at substantially a right angle with each other, and then severing said blank from the bar at such distance below said arms as to leave the necessary metal for forming the spindle.

The next operation consists in giving form to the arms *a*, which is accomplished by the following-described means:

Within the upper side of a metal block, B, is formed a vertical, central spring, *b*, that corresponds in general shape and diameter to the like features of the body of the blank A, and has such depth as may be desired for said part.

Extending lengthwise of the block B is a half-round groove, b^1, which intersects the opening or recess *b* and has a slightly
122 greater depth at its ends than at its longitudinal centre and a slightly greater width at the latter point than at said ends. At the upper end of said recess *b* the corners are rounded, as shown.

The blank A is suitably heated and placed within the die B, its body being within the recess b, and its arms a over the grooves b^1, after which a plane-faced upper die, C, is caused to impinge one or more times upon said blank until the latter is caused to conform to and fill said recess and groove; said arms being in a line with each other, as seen in figure 2.

The blank A is now relieved of its projecting fin by any suitable means, after which it is operated upon by a second set of dies as follows:

A block, D, is provided with an U-shaped cavity, d, within and extending longitudinally across its upper side, and has at the bottom of such cavity a vertical recess, d^1, that corresponds to the size and shape of the body of the blank A.

From the recess d^2 a groove d^1 extends outward and upward within the sides of the cavity d, and has such depth and transverse dimensions and shape as will cause it to conform to the like features of the finished arms a of the blank A, said grooves being increased in width at the bottom of said cavity until they extend upon each side of said recess d^2, a distance equal to the entire breadth of other portions of said arms.

An upper die E is provided upon the lower side with a projection e, which corresponds in shape and size to the cavity d of
123 the die D, and fills the same when said dies are brought together.

The blank A is taken as it comes from the die B, and placed across the cavity d of the die D, the body of said blank being directly over the recess d^2, and its arms over and in a line with the groove d^1, after which the die E is caused to strike one or more blows upon said blank; such operation causing the latter to be bent to the form shown in Fig. 3, and the surplus metal at the point where said arms join said body to be thrown outward and form wings or lips a^1.

The king bolt is completed by drawing out the shank A and by rounding and threading the ends of the clip arms a, as shown in Fig. 4, any desired or usual means being employed for such purpose.

Having thus fully set forth the nature and merits of my invention, what I claim as new is:

Erased by amdt., filed April 11, 1879. First. The blank A, a, a, for forming clip king bolts, substantially as specified.

First. The die B, b, b^1, and the die C constructed and combined, substantially as and for the purpose shown.

Erased by amdt., April 11, 1879. First. The die D, d, d^1, d^2, and the die E, e, constructed and combined substantially as and for the purpose set forth.

Second. The series of dies B, C, D, and E for forming clip king bolts, substantially as shown and described.

In testimony that I claim the foregoing, I have hereunto
124 set my hand, this 21st day of February, A. D. 1878.

R. R. MILLER.

Witnesses:
GEO. S. PRINDLE.
MARCUS H. HOLCOMB.

Oath.

COUNTY OF HARTFORD, } ss:
State of Connecticut, }

Robert R. Miller, surrenderer of the hereinbefore-named patent, being duly sworn, deposes and says: That he verily believes that by reason of an insufficient and defective specification, said patent is not fully valid and available, and that the said error has arisen from inadvertence and mistake, and without any fraudulent or deceptive intention, and that he verily believes that all parts or combinations now set forth as new in the specification and included in the claims were invented by him; also that the entire title in and to said patent and invention is vested in Julius B. Savage, the Atwater Manufacturing Co., and himself, as will fully appear by the certified abstract of title filed herewith.

[SEAL.] W. H. HOLCOMB,
Notary Public.

UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the digest of this office of all assignments of undivided
125 interest found of record under or relating to letters patent granted to R. R. Miller, assignor to self and Julius B. Savage, No. 100,053, February 22, 1870, for "Series of dies for forming the heads of bolts."

In testimony whereof, I, W. H. Doolittle, Acting Commissioner of Patents, having caused the seal of the Patent Office to be hereunto affixed, this fourth day of March, in the year of our Lord one thousand eight hundred and seventy-nine, and of the Independence of the United States the one hundred and third.

[L. S.] W. H. DOOLITTLE,
Acting Commissioner.

126 Assignors.	Assignees.	Date of assign't.	Date of record.	Invention.	Territory assigned.	Liber.	Page.
Robert R. Miller.	Robert R. Miller, J. B. Savage.	July 23, '69	Aug. 2, '69	"Dies for forming king bolts."	His right. The patent to issue to the said assignees.	*y* 11	114
Same.	"The Atwater Manufactur'g Company."	Mar. 1, '70	Mar. 9, '70	Same. Feb. 22, '70 100,053.	All his right in said patent, the same being one-half of the entire patent, together with any extension of the same.	*s* 12	245
J. B. Savage, Atwater Manufacturing Company, by M. N. Woodruff, president.	R. R. Miller, of Plantsville, Conn.	Feb. 21, '79	Mar. 4, '79	Same.	One-third of all their right, title, and interest in said invention, as secured by said letters patent.		

127 M. L. D.

ROOM NO. 6, DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE,
WASHINGTON, D. C. *April* 2, 1879.

ROBERT R. MILLER,
Care of Prindle & Co., Washington.

Dies for Forming King Bolts.

March 4, 1879.—Reissue.

The invention specified in claims 1 and 3 of the above application is anticipated in the patent 96251, granted to F. B. Morse Oct. 26, 1869, and said claims are therefore rejected.

J. W. JAYNE, *Ex'r.*

THE COMMISSIONER OF PATENTS:

In the matter of the application of R. R. Miller for reissue of letters patent No. 100,053, dated Feb. 22, 1870, for improvements in dies for forming king bolts, filed March 4, 1879, we hereby amend the specification by erasing from the commencement of line 13 to close of line 15, of page 2. (Page 63, lines 1, 2, 3.)

We farther amend by erasing the word "farther" from the 16th (page 63, lines 4 and 5) line of said page, and substituting therefor the word "principally."

We farther amend by erasing from commencement of line 18 to close of line 20 of same page. (Page 63, lines 6, 7, 8.)

We farther amend by erasing the word "finally" from line
128 21, and substituting therefor the word "farther."

We finally amend by erasing claims 1 and 3.

Respectfully, PRINDLE & CO.,
Att'ys for Miller.

69916. Memorandum of fee paid at U. S. Patent Office: $30.00. Inventor: R. R. Miller. (Filed March 4, '79.) Patent to be issued to

——. Name of invention, as allowed. Reissue of patent No. 100,053, (Feb. 22, '70.) Date of payment: ——. Fee: Reissue, $30.00. Solicitor: Prindle & Co. Date of circular of allowance: ——. Send patent to ——.

129 Div. 13. 1879. 69

Reissue. 916

No. 8694.

Robert R. Miller, assignor by mesne ass'ts to himself, J. B. Savage, and Atwater Manufacturing Co.

Of Plantsville.
County of Hartford.
State of Connecticut.

Series of dies for forming the heads of king bolts.

Reed, March 4, 1879.
Petition, " " "
Affidavit, " " "
Specification, " " "
Drawing, 2 sheets, " " "
Abstract of title, " 6, "
Old patent No. 100,053, Feb. 22, 1870.
Cert. dep.
1. Cash, $30, March 22, 1879.
Examined, J. W. Jayne, April 11, 1879.
2. Issue, April 12, 1879. Seely.
4. Patented Feb 22, 1870.
Reissued May, 6, 1879.
Circular, April 12, 1879.

PRINDLE & CO., Present.

130 1879.

Contents.

Application —— papers.
1. Rejection, April 2, 1879.
2. Amendment, April 11, 1879.
3. Passed April 11, 1879.

Title.

Improvement in series of dies for forming the heads of king bolts

Ex.: J. A. W.
M. McK.

133

James Phelps, of Red Creek, N. Y., ass'or to self and Isaac F. Mosher, letters patent No. 59,642, dated Nov. 13, 1866, imp't in king bolt for carriages.

To all whom it may concern:

Be it known that I, James phelps, of Red Creek, in the county of

Wayne, State of New York, have invented an improved king bolt for carriages; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification, Fig. 1 being a front side view of the king bolt; Fig. 2 a side view thereof at right angles to the view in Fig. I. Like letters designate corresponding parts in both figures.

Instead of passing the shank of the king bolt through the front axle of the carriage in the usual manner, I make two
131 shanks, A, A, which embrace the axle H, and in its bed, or bolster piece, I. The shanks terminate with screws, *a*, *a*, upon which nuts, *g*, *g*, are screwed, and tighten a cross clasp, *a*, up against the axle, and thus firmly secure the bolt to the axle. This method of making the king bolt, and attaching it to the axle, renders the axle much stronger than if perforated to receive the bolt. The king bolt is also much more easily and cheaply made, using malleable iron. An important feature of this construction is the extended bearings or shoulders, B, B, which rest upon the axle or bed pieces, I, which steadies and strengthens the bolt, and prevents the king bolt from wearing into the wood, as it would without this. The top, D, of the king bolt passes up through the reach iron, or perch plate, and is held by a nut screwed upon it, between the perch plate and head block, thus avoiding the rock of the head block and spring. It has a shoulder, *c*, for the weight of the carriage to rest on, thus taking it in a great measure from the circles and obviating much of the wear thereof.

What I claim as my invention, and desire to secure by letters letters patent, is the projecting shoulders or bearings, B, B, resting on the axle at the fork of the king bolt, for the purpose herein specified. The above specification of my improved king bolt for carriages, signed by me, this eighteenth day of September, 1865.

JAMES PHELPS.

Witnesses:
ISAAC F. MOSHER.
J. D. COVERT.

Ex'd: H. M. H., C. K.

(Here follow diagrams, marked pp. 132, 133.)

134 And on the said 11th day of June, 1881, complainants' evidence in rebuttal was filed in the words and figures following, viz:

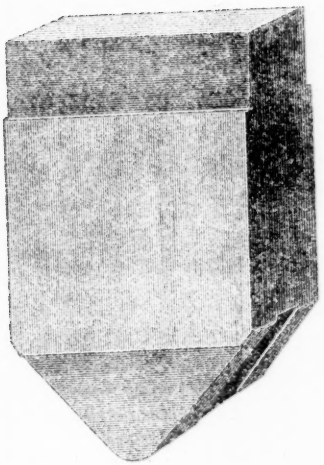
Complainants' Evidence in Rebuttal.

United States Circuit Court, District of Connecticut. In Equity.

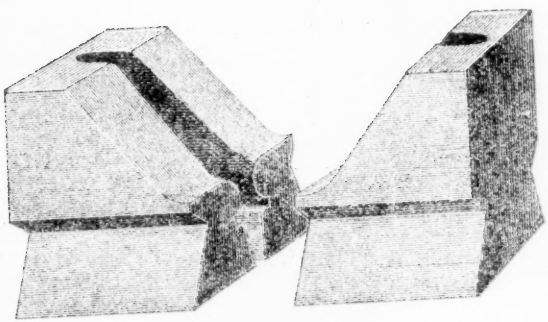
THE ATWATER MANUFACTURING COMPANY *et al.*
vs.
THE BEECHER MANUFACTURING COMPANY.

NEW HAVEN, CONN., *Dec.* 30, 1880.
Office of F. G. INGERSOLL, Esq., 179 Church St.

Present: G. S. Prindle, Esq., and C. R. Ingersoll, Esq., counsel for



No. 224
Beecher Mfg Co
et al
Atwater Mfg Co et al
} p 132



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DEFENDANT'S EXHIBIT No. 1.

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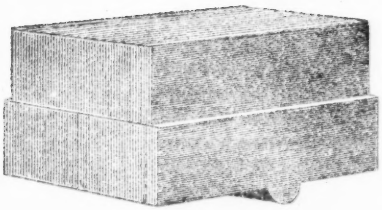
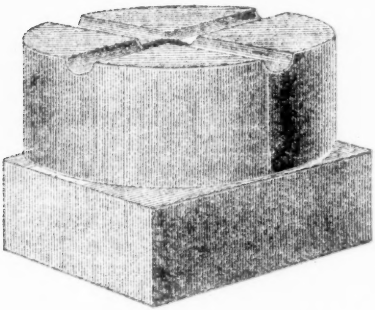


No 224.
Beecher Mfg. Co.
vs.
Atwater Mfg. Co. et al
} p. 133.



A

EXHIBIT 13.

complainants, and D. F. Southwick, Esq., secretary of defendant corporation. Mr. Fenton, counsel for defendant, was not able to be present, but consented that the examination should go on.

135 LEANDER BURNS, a witness produced by and on behalf of complainants, being duly cautioned and sworn, answered to questions proposed by C. R. INGERSOLL, Esq., of counsel for complainants, as follows:

207th Int. What is your name, age, residence, and occupation?

Ans. Leander Burns; Portchester, N. Y.; tool maker by trade, or die sinker; age 56.

208th Int. Have you ever been engaged in the manufacture of clip king bolts; and, if so, state when, where, and in what manner you first made such article?

Ans. I have. First engaged with Mr. Wilcox, Portchester, N. Y.; first made clip king bolts in '59, under the process of ordinary blacksmith tools.

209th Int. Do you know of any such bolts being made, by any one, before you commenced so to make them?

Ans. I did not, and I believe that I was the first party to make the clip king bolt.

210th Int. Describe a little more particularly the process you then used, and which you call the process of ordinary blacksmith's tools.

Ans. Blacksmith tools consisted of tongs, heading tools, chisels, fullers, swedges, and sledges.

211th Int. Did you, at any time after that, change, in any way, your manner of making such bolts? If so, state when, and in what way?

Ans. I did. As near as I can recollect, it was in 1862 or 1863; I am not positive. The change consisted in the manner or mode of holding the bolt—from the process of a heading tool to a vise, termed a foot vise.

136 212th Int. Please describe the heading tool you refer to, and also describe the foot vise which succeeded it.

Ans. A heading tool is a block of steel with a handle to it, with a hole in, to place on the anvil over the hole of the anvil, for the purpose of heading or forming iron. The foot vise is a vise-jaws that opens and shuts, with a cam to work by your foot, to hold work for to head or form iron.

213th Int. Describe the blacksmith's tool you call a fuller, and its purpose.

Ans. A fuller is a piece of steel with an eye for to receive a handle; it is used in blacksmithing for various purposes, such as drawing and shaping iron. The face of it is made round; it is used as a hand tool, placing the face on the metal or iron, and struck with a sledge or hammer.

214th Int. Now describe the process you employed with these tools, in your manufacture of clip king bolts, after 1863, at Mr. Wilcox's in Portchester, N. Y.

Ans. After 1863, the bolt and collar was formed under the trip hammer. The object of the vise was this—the vise opened and shut

to receive the bolt; the clip part of the bolt was split by a hand chisel or a blacksmith's chisel, and placed in the foot vise, and the fork or crotch of the bolt was formed with a common blacksmith's fuller. The clip part of the bolt was formed by placing it on the corner of the anvil, and swedged to its proper shape with a swedge made for the purpose, struck on with a sledge by hand.

215th Int. Did the foot vise and fuller serve any other purpose than to shape the crotch or yoke of the bolt?

137 Ans. The foot vise was so constructed as to form a proper shape to the crotch of the bolt. That was all the purpose it served. The clip was formed on the anvil by the swedge.

216th Int. For how long after 1863 was the process which you have last described used at Wilcox's in their manufacture of clip king bolts?

Ans. I think it was used for eight or nine years.

217th Int. During what years did you work at the Wilcox factory in Portchester; I mean the factory of Josiah Wilcox?

Ans. I was employed there in the neighborhood of thirty years, commencing about thirty-five years ago.

218th Int. Did Josiah Wilcox at any time thereafter make any clip king bolts by any other process than such as you have last described; and, if so, when did he commence such manufacture, and describe it?

Ans. He did, in October, 1870. He changed the process from the foot vise to a solid die placed under a drop, for the purpose of forcing the crotch, or fork, and clip of the bolt at once, or in one process.

219th Int. And by what process were the clips bent into proper shape after being formed by the dies you have mentioned?

Ans. They was placed into a solid die, made or shaped to give the bolt a proper shape to go on the axle of a wagon. There were two dies, an upper and a lower, to give it the proper shape.

220th Int. Are you able in any way, other than your present recollection, to fix the time as October, 1870, when Mr. Wilcox commenced making dies by this last described process?

Ans. I am. My record on my books, where he gave me

138 credit for the amount in making the bolts. I had the contract for making them.

221st Int. Had you at this time information that clip king bolts had been made elsewhere by such a process as was then adopted?

Ans. I had knowledge of king bolts being made in other places, but no positive knowledge of the manner in which they were made. But I came to the conclusion by the looks of the bolts in market that they were formed under a drop.

222d Int. What advantages did you find in the new process of making the clip king bolts by dies, as you have described, over the former process, or processes, of making them by the hand tools?

Ans. Could make them cheaper and better.

223d Int. How much cheaper and better?

Ans. I think there is about, I couldn't say positively, but nearly half in making, and much better; I couldn't describe how much.

224th Int. How many more did you turn out per day, after you

commenced the new process, than you had turned out by the old hand way?

Ans. Never took any particular account, but should judge nearly as many again, or double the quantity.

225th Int. How many bolts would one man and a helper complete by the old process in a day?

Ans. About a hundred.

226th Int. How many could one man make by the dies?

Ans. Forge about two hundred a day.

139 227th Int. Did Josiah Wilcox make, during the time that you were with him, any clip king bolts other than those that you were employed upon?

Ans. No others that I knew of. Other people worked on them, but there were no others made, except by the processes I have described.

228th Int. What was your employment there?

Ans. I was a tool maker by trade; made the tools and took contracts; I had a contract for making king bolts; I first had a contract in 1870, making them under a drop; before 1870, other men, employed by Mr. Josiah Wilcox, made them.

229th Int. Please described the difference in the two processes you have mentioned, the die process and the hand tool process, which resulted in the advantages you have indicated?

Ans. The difference in the two processes—the foot vice and hand process, you went through two operations to form the clip; in the die process, the clip of the bolt was formed by one process.

230th. Int. Was there an advantage in the solid die in respect of forming the crotch or yoke over the two vise jaws.

Ans. I think there is; on a vise, or an open die, it has to be opened and shut by a cam or screw, and, it is not so permanent as a solid die. The open and shut vice is liable to form a fin between the jaws.

LEANDER BURNS.

No cross.

Sworn to before me—

FRANCIS G. INGERSOLL,
Notary Public.

140 LEANDER BURNS, a witness previously produced by and on behalf of complainants, being recalled, answers as follows to questions proposed by C. R. INGERSOLL, Esq., of counsel for complainants:

231st Int. Are you acquainted with George E. Wilcox, of Portchester, N. Y., and, if so, have you seen him write, and are you acquainted with his handwriting?

Ans. I am acquainted with him; I have seen him write, and am acquainted with his handwriting.

232d Int. Please look at the letter now handed you, and state whether it is in the handwriting of George E. Wilcox?

Complainant puts in evidence the letter referred to in last question, and it is marked Complainants' Exhibit D.

F. G. I., *Notary Public.*

Ans. I should say that it was George E. Wilcox's handwriting.

LEANDER BURNS.

No cross.

Sworn to before me—

FRANCIS G. INGERSOLL,
Notary Public.

DENNIS P. WEBSTER, a witness produced by and on behalf of the complainants, being duly cautioned and sworn, answered to interrogatories proposed by C. R. INGERSOLL, Esq., of counsel for complainants as follows:

233d Int. What is your name, age, residence, and occupation?

Ans. Dennis P. Webster; Southington; 37; forging.

224th Int. Have you been engaged in the manufacture of
141 clip king bolts by dies; if so, when did you commence such manufacture, and where, and for how long have you continued it?

Ans. Since the year 1868 I have been engaged in manufacturing king bolts; from 1868 to 1878 at J. B. Savage's; since that time at Atwater Manufacturing Company.

235th Int. At what time in 1868 did you commence such manufacture, and with what kind of dies; state the circumstances of your engaging in that work at that time?

Ans. July, 1868; I was in the bolt business, and shifted my work to carriage hardware business; thought I would like it better; commenced to work with R. R. Miller, helping around the fire on this work—king bolts; worked with him, helping him, two or three months.

236th Int. Do you mean by R. R. Miller one of the complainants in this suit and the patentee in the patent in question?

Ans. Yes, sir.

237th Int. Where was Mr. Miller working at that time, and what sort of dies was he using in that work?

Ans. He was working at J. B. Savage's, at Southington; he was using a set of dies for striking a king bolt.

238th Int. Look at Figs. 5 and 6 in the drawings of the patent, "Complainants' Exhibit A," and state whether they substantially represent the dies you have referred to as then used by Mr. Miller.

Ans. They do.

239th Int. Were king bolts then made by Mr. Miller with those dies and completed for the market?

Ans. Yes, sir.

142 240th Int. Look at "Complainants' Exhibit B C," and state whether at any time after you went to work with Mr. Miller in July, 1868; and, if so, about when dies like such exhibits were used by him in the manufacture of clip king bolts?

Ans. Yes, sir; I should judge about in the neighborhood of a year after I went there that we commenced with these.

241st Int. And for how long since then have you been engaged in the use of such dies as these in the manufacture of king bolts?

Ans. I think ever since the year 1869; somewhere along in the year 1869 to the present time.

242d Int. What was the object in providing the original dies with the transverse depression and projection shown in "Comp. Exhibit B C.?"

Ans. The object was that it would give you a better guide to work by; when trimming the work it centers it better; it centers it better, because you can drop your work into the slot of the trimming dies and get it exactly true; you don't have to stop to guage it as you do in the old dies; this was the only object of it; you can make as good a bolt on the old dies, but not so conveniently.

243d Int. State whether with either the dies you call the old dies or the dies like "Complainants' Exhibits B C," you can make both flange king bolts and plain king bolts; that is, king bolts with or without the flange.

Ans. Yes, sir.

244th Int. State why this is so.

Ans. The difference is that in making them you use less
143 stock for a plain bolt than you do to make a flange; the trimmers are different; one trims for a plain bolt and the other for a flange bolt.

245th Int. Do you know this by experience; have you made both flange and plain king bolts by the same dies?

Ans. Yes, sir.

246th Int. And for how long?

Ans. For all the time that I have been working there.

247th Int. Since you have been with the Atwater Company have they, or not, made nearly as many plain king bolts as flange king bolts, and with the same dies, without any change in the dies?

Ans. Yes, sir; the only change was in the trimmers, as I have stated.

248th Int. How many clip king bolts can one man with such dies as you have used, and a helper, strike up in a day?

Ans. I can strike up four hundred alone, without a helper.

249th Int. How many such bolts can be finished for the market in a day by two men?

Ans. About four hundred.

250th Int. You have said that you have been engaged in making king bolts from July, 1868, to the present time; have you, all that time, used these dies you have spoken of in such work, or have you made them in any other way during that time?

Ans. I have used the dies that I have spoken of and used no other dies.

251st Int. For how long after you went to J. B. Savage's, in 1868, did Mr. Miller continue there?

144 Ans. He continued a year or more; over a year, I should

think; he went away a short time and came back; off and on, I should judge, I worked with him eight or nine years.

DENNIS P. WEBSTER.

No cross.

Sworn to before me—

FRANCIS G. INGERSOLL,
Notary Public.

Adjourned to Friday, Dec. 31st, 1880, at 9.30 o'clock a. m., same place.

NEW HAVEN, CONN., *Dec.* 31, 1880.
9.30 o'clock a. m., 179 Church street.

Met pursuant to adjournment.

Present: Geo. S. Prindle, Esq., and C. R. Ingersoll, Esq., counsel for complainants, and D. F. Southwick, Esq., secretary of defendant corporation.

DENNIS P. WEBSTER, a witness examined Dec. 30, 1880, being recalled by complainant, testifies as follows:

252d Int. Have you, since your testimony yesterday, been led to think that you were in error as to the time when you worked with Mr. Miller, at Mr. Savage's; if so, do you wish to correct any statement you have made in that respect?

Ans. Yes, sir; I have since learned that it was, by the books at Savage's, 1869 instead of 1868—Sept., 1869, that I commenced to work there; I came to make the mistake by thinking I went there the same year with Mr. Woodruff, and he told me that he went there in 1868—July 1st, 1868.

145 253d Int. In all other respects, is your testimony given yesterday correct?

Ans. Yes, sir.

DENNIS P. WEBSTER.

No cross.

Sworn to before me.

FRANCIS G. INGERSOLL,
Notary Public.

Complainants' counsel states that the exhibits put in evidence by the defendants have ever since their introduction in evidence been in defendants' possession, and defendants' counsel were notified sometime since to send them to complainants' counsel for the purposes of this examination, but they have not been received, and are now believed to be in Philadelphia, and therefore complainant has been and is compelled to examine the witnesses now and yesterday present without such exhibits.

ROBERT R. MILLER, a witness produced by and on behalf of the complainants, being duly cautioned and sworn, answered to questions proposed by C. R. Ingersoll, Esq., as follows:

254th Int. What is your name, age, residence, and occupation, and are you one of the complainants and the inventor of the invention in question?

Ans. R. R. Miller; 53; Southington; blacksmith. I am one of the complainants and the inventor.

255th Int. When did you first complete for market clip king bolts by the use of the dies described and shown in your letters patent "Complainants' Exhibit A."

Ans. First king bolts that I made was for a sample king
146 bolt; was in April, 1868. I commenced making king bolts for the market along about June, 1868, and, in making them, used such dies and in the manner described in the patent.

256th Int. Where were you working when you made the sample bolt in 1868?

Ans. H. D. Smith & Co., Plantsville.

257th Int. When did you go to H. D. Smith & Co.?

Ans. Went the 10th day of May, 1866.

258th Int. Was H. D. Smith & Co. then using their old or their new shop?

Ans. The old shop. They didn't get down to the new shop till sometime in 1867.

259th Int. How long after you commenced making king bolts by your dies in 1868, as you have testified, did you remain with H. D. Smith & Co.?

Ans. I remained with them till after July, 1869.

260th Int. During all that time did you or not continue to make clip king bolts in the manner you have testified for the market?

Ans. Not all the time. There was three months I was steady on them—the first part of the time. Some other parties worked on them then. H. D. Smith & Co. continued the manufacture during the time by the same dies.

261st Int. On leaving H. D. Smith & Co.'s where did you go?

Ans. To Mr. J. B. Savage's, Southington.

262d Int. How long did you remain there?

Ans. Between eight and nine years.

147 263d Int. During the last mentioned period did Mr. Savage make clip king bolts by the use of dies according to your invention?

Ans. He did.

264th Int. Look at the "Complainants' Exhibit B," and state whether they represent the forming dies used while you were at Savage's?

Ans. These represent the forming, we call them welding dies, used at J. B. Savage's.

265th Int. When, and at whose suggestion, was the projection in the upper and the transverse depression in the lower die made in the dies shown in the drawings of the patent?

Ans. I think we used the plain dies for about a year or over. It was over a year. I can't be positive who suggested it.

266th Int. For what purpose was the alteration made; and what purpose does it serve in the operation of the dies?

Ans. It is for centering the bolt when you trim it. That's about all the benefit it is.

267th Int. Does it serve any other purpose whatever?

Ans. In my opinion, it does not.

268th Int. State whether or not by either the plain dies or the dies with the traverse depression, you were able to make clip king bolts with or without flanges.

Ans. Yes, sir; I can make them in either dies.

269th Int. What distinguishes the modes of making plain or flanged king bolts by the dies?

Ans. In making the flanged bolt you require a little more stock than you do for making a plain king bolt; otherwise the bolts are made exactly alike.

148 270th Int. Do the trimmers serve any purpose in that manufacture?

Ans. Yes, sir; we have what they call the plain trimmers, for making a plain bolt. They are used for that purpose. The flange trimmers are used for trimming the flange bolt.

R. R. MILLER.

No cross.

Sworn to before me—

FRANCIS G. INGERSOLL,
Notary Public.

HENRY R. NORTON, a witness produced by and on behalf of the complainants, being duly cautioned and sworn, answered to questions proposed by C. R. INGERSOLL, Esq., as follows:

271st Int. What is your name, age, residence, and occupation?

Ans. Henry R. Norton; 46; Southington; mechanic.

272d Int. Did you ever work for H. D. Smith & Co., in Plantsville; if so, when?

Ans. In 1868 I worked for them. I commenced in January, I think, and worked till July.

273d Int. Was Robert R. Miller at work there during that time?

Ans. Yes, sir.

274th Int. Did you do any work for Mr. Miller during that time; if so, what was it:

Ans. Striking out king bolt blanks: what we call breaking them down.

275th Int. What did he do with the king bolt blanks which you had broke down?

149 Ans. Formed them, and finished them.

276th Int. How did he form them, and finish them?

Ans. With dies.

277th Int. Look at "Complainants' Exhibit A," and state whether you find anything there representing the dies then used by Mr. Miller to make such king bolts.

Ans. Fig. 5. looks like it to me. I could tell by the dies better than I could by that.

278th Int. How were the blanks bent into the U-shaped form?

Ans. By dies.

HENRY R. NORTON.

No cross-examination.

Sworn to before me—

FRANCIS G. INGERSOLL,
Notary Public.

FREDERICK L. ELLIS, a witness produced by and on behalf of the complainants, being duly cautioned and sworn, answered to questions proposed by C. R. INGERSOLL, Esq., as follows:

279th Int. What is your name, age, residence, and occupation?

Ans. Frederick L. Ellis; 35; Milldale, town of Southington; tool maker.

280th Int. What experience have you had in the making and operation of dies for forging metal?

Ans. I have been brought up in that business ever since I was 12 years old.

281st Int. Have you any interest in this suit or any connection whatsoever with the parties to it?

150 Ans. I have not.

282d Int. Complainants' counsel offers in evidence a pair of dies which are marked "Complainants' Exhibit E and F." Look at the "Exhibit E and F," and state whether or not you have recently operated those dies at the factory of J. B. Savage; and, if so, state when and with what object and result?

Ans. I superintend the operation of those dies in construction of a clip king bolt at the factory of Capt. Savage, in Southington, on Monday, December 13, 1880. The object and purpose was for ascertaining whether the flange or plain king bolts could or could not both be made in one and the same die, and also to see if the king bolt, whether flanged or not, could be made with this die—"Complainants' Exhibit E and F"—the die E having, as will appear, a plain surface. The result was that we succeeded at once in making the plain and flanged bolt with the dies, as they now are.

283d Int. Have you here, and, if so, please exhibit them, samples of the bolts then made by you in the different and successive stages of the manufacture, and in presenting them describe the process of manufacture.

Ans. I have. This is the blank prepared for the dies.

(Blank referred to by witness is put in evidence by complainants' counsel, and is marked Complainants' Exhibit G.)

This is the king bolt after the blank is struck by the dies "E and F."

(Complainants' counsel put in evidence the king bolt referred to by the witness, and it is marked Complainants' Exhibit H.)

This bolt, like "Exhibit H," was then put into the trimming
151 dies, and it came out like the bolt now presented; and this bolt now presented is one that at that time came from the trimming dies.

(Counsel for complainant puts in evidence the bolt presented by witness, and it is marked Complainants' Exhibit I.)

The bolt, like "Exhibit I," was then put into the bending dies, and it came out like the bolt now presented, except that it was without the flanges. The bolt which actually came out after "Exhibit I" seems to have been mislaid, for I do not find it here, but the bolt I now present came out of the same bending dies, but had been purposely trimmed for a flange bolt.

(Counsel for complainants puts in evidence the bolt last presented by the witness, and it is marked Complainants' Exhibit K.)

The bolt was then taken to the trip hammer, and the collar and shank were drawn out, when it appeared like the one now presented.

(Complainants' counsel puts in evidence the bolt presented by witness, and it is marked Complainants' Exhibit L.)

It was taken to the finishing dies, and came out as this.

(Counsel for complainant puts in evidence the bolt last presented by the witness, and it is marked Complainant Exhibit M.)

284th Int. In what consisted the difference of operation in making a flange bolt from that in making a plain bolt?

Ans. A little more stock was necessary in the blank "Complainants' Exhibit G," in order to throw a wider flange, the shape being altered by a flange trimming die; the plain king bolt being trimmed in a plain trimming die.

285th Int. Did you make at this time both plain and flange bolts?

Ans. We did make both.

152 286th Int. If you have any model of the flange trimming dies in use at the factory, please present it, and state in what respect the plain trimming dies differ from it?

[Ans.] This is a model of the flange trimming die.

(Complainants' counsel puts in evidence the model presented by witness, and it is marked Complainants' Exhibit O.)

The plain trimming dies differ from this one by being plain at the center—narrower.

287th Int. What is the object of the transverse depression in the lower trimming die of which "Exhibit O" is the model?

Ans. The transverse depression is merely to center the bolt, so that it can be trimmed, central with the shank.

288th Int. Look at "Complainants' Exhibit B and C," and state whether you have seen dies, such as those, operated in the making of king bolts; and, if so, state what is the object of transverse depression there shown in the lower die?

Ans. I have seen such dies in operation. The transverse depression being central with the body of the bolt, corresponding in size and shape to the transverse depression in the trimming dies, thereby centering the bolt by giving the blank a shape that will fit into the

trimming dies. The same kind of bolt can be made, without the depression in both dies, referred to, but not so conveniently.

No cross-examination.

FREDERICK L. ELLIS.

Sworn to before me—

FRANCIS G. INGERSOLL,
Notary Public.

153 R. R. MILLER, a witness heretofore examined by counsel for complainants, being recalled by same, testifies as follows:

289th Int. Did H. D. Smith & Co., with whom you have testified you worked from May, 1866, to some time in 1869, make any clip king bolts, by dies, while you were there, before making them by your dies as you have already testified?

Ans. He did not.

R. R. MILLER.

Sworn to before me—

FRANCIS G. INGERSOLL,
Notary Public.

Counsel for complainants here states that he has just received a telegram from H. T. Fenton, of counsel for defendant, requesting him to file with the examiner said Fenton's telegram to said complainants' counsel, stating cause of absence, and requesting privileges. Counsel for complainants accordingly files with the examiner the telegram he supposes is referred to, and it is marked Fenton Telegram.

And counsel for complainants also requests the defendant to file with the examiner said Fenton's telegram to Mr. Southwick, the defendant's secretary, which was communicated to complainants' counsel, before the examination was commenced on the 30th.

Adjourned to Saturday February 12th, 1881, at 10 o'clock a. m., same place.

154 NEW HAVEN, CONN., *Feb. 12th*, 1881,
179 *Church St., Room* 8.

Met pursuant to adjournment, at 10 o'clock a. m.

Present: C. R. Ingersoll, Esq., of counsel for complainant; H. T. Fenton, Esq., counsel for defendant.

JOHN E. EARLE, a witness produced by and on behalf of the complainants, being duly cautioned and sworn, to interrogatories proposed by C. R. INGERSOLL, Esq., answered as follows:

291st Int. What is your name, age, residence, and occupation? And state whether, or not, you have frequently been examined as a mechanical expert in patent causes.

Ans. John E. Earle; 50 years of age; New Haven, Conn.; solicitor of patents; and have been many times examined as a mechanical expert in patent causes.

291½ Int. Have you read and are you acquainted with the contents of the reissued letters patent of May 6, 1879, issued to the com-

plainants, and which are the subject of this suit, for an improvement in series of dies for forming the heads of king bolts?

Ans. I have, and am.

292d Int. Please state whether or not, in your opinion, clip king bolts, both with flanges and without flanges, can be made by the series of dies shewn and described in the reissued letters patent referred to, and please give your reasons for such opinion.

Ans. They can. The question of whether the bolt has a
155 flange, or not, depends solely upon the trimming of the blanks, after the operation of the first or forming dies. I have seen both flanged and unflanged bolts thus made by complainants' dies.

When the blank is struck in the first or forming dies the surplus metal is thrown to the right and left from the shank and arms, and is of sufficient width at the centre for the flange, *i. e.*, the width at the head end of the shank is at least as wide as the flange of a flanged bolt at the same point. Then, if the blank thus formed be placed in trimming dies, giving the shape of a flange bolt, the subsequent operation produces the bend at the flange and a flanged bolt. If, on the contrary, the blank be trimmed in a straight trimmer, that part which formed the flanges in the first instance would be cut off, the result being an unflanged bolt. The last dies of the series performing precisely the same operation, whether it be with or without the flange.

293d Int. Look at "Complainants' Exhibits E and F," and state whether, in your belief, they are the forming dies used in the series of dies, when you saw the bolts made, both flanged and unflanged, as you have testified.

Ans. They are like the dies I saw used, and I believe they are the same.

294th Int. Was Frederick L. Ellis present, and did he superintend the operation of those dies on the occasion you have referred to?

Ans. It was a Mr. Ellis who superintended the work, and I have no doubt it was Mr. Frederick L.

295th Int. Have you heard read the testimony of Frederick
156 L. Ellis in this case? And, if so, state whether he describes correctly or not the operation of such dies on that occasion.

Ans. I have, and he correctly describes the operations.

296th Int. Have you also seen in operation, in a series of dies, forming dies provided with the transverse projection and corresponding depression shown in the models "Complainants' Exhibits B and C"?

Ans. I have.

297th Int. State what office in such dies is served by such projection and depression, and give your reasons for any opinion you may express.

Ans. In the operation of trimming the blank after it comes from the forming dies, the blank is of the shape seen in "Complainants' Exhibit H." In the next or trimming operation the blank is laid upon a die, in which is an opening corresponding to the shape of the clip arms. If the surface of the open trimming die be flat, great

care is necessary in order to so place the blank to be trimmed that the shank will come in a central position.

The rib or projection on the face of the one part and corresponding depression on the face of the other part of the model "Complainants' Exhibit B and C" is solely for the purpose of enabling the blank to be accurately set in the trimming die.

The rib and depression are transversely across the blank on the axis of the bolt. Dies like the exhibit, therefore, form a projection on the under side of the blank, across the face of the trimming die, like "Complainants' Exhibit O." There is a corresponding depression, so that when the blank is placed thereon the projection on the under side of the blank will lie in that depression, and
157 thus properly locate the blank, without the care necessarily exercised when the face of the trimming die and blank are flat. Otherwise than this location of the blank on the trimming die, the projection and depression on the forming dies have no office or function.

298th Int. Look at "Defendant's Exhibit No. 1" and state whether or not, in your opinion, it is practicable to bend, by such dies, the blank when it comes from the forming and trimming dies, but with a collar forged upon the shank, so that it would become of the shape of "Defendant's Exhibit 10 and 11."

Ans. No, sir; it would not. First, it would be very difficult and impracticable to form the collar on the shank, with the blank in the condition stated. The arms of the blank extend from the shank, at nearly right angles, to the right and left. The forging to be performed must be done close up to the arms. This forging is performed by a pair of dies, each having a cavity corresponding to one-half of the collar, and arranged to strike rapidly one upon the other. The shank is introduced between these two dies, and while the dies reciprocate, the shank is revolved so as to give to the collar the required shape without throwing out a fin between the dies.

The arms, extending to the right and left from the shank, would seriously interfere, if not practically prevent, this necessary revolution of the blank. Second, as ordinarily constructed, the arms, when standing vertically, would interfere with the die holder both above and below.

But, if it were possible to form the collar on the shank, it would still be impracticable to bend the blank in dies like "De-
158 fendant's Exhibit 1," because the arms would be in the way and prevent the possibility of closing the dies upon the collar of the shank. Third, if the blank be held and secured between the two parts of the die, "Defendant's Exhibit No. 1," and the upper die be stuck down thereon, to give the necessary bending shape, there would be great danger of injuring the shape of the collar by the downward stroke or force; it being understood that this bending and shaping must be done while the metal is hot and easily forced.

299th Int. If such bending were practicable in such dies, would it make any difference in respect of the bending that the dies were made sectional instead of solid?

Ans. No, sir; it would not, for the reason that when the bending

is performed the two parts of the die must be held together as if they were a single piece or solid die. The separation into two parts being only a convenience for setting the collar in its cavity, and when set therein, and the two parts closed, they are, so far as the operation is concerned, a solid die.

Cross-examination by H. T. FENTON, Esq., counsel for defendant:

300th X Int. Will a pair of dies, as shown in "Defendants' Ex. 13," necessarily form a flanged king bolt of such conformation as "Defendants Exhibit No. 11?"

Ans. As I before stated, whether or not the bolt be flanged, depends upon the trimming, and not upon the forming dies.

If the blank placed in the forming dies, like "Defendants' Exhibit 13," have sufficient metal to throw out to the right and left from the center, to an extent equal to or more than the extent of the
159 flanges "Defendants' Exhibit No. 11," the result would be a blank, which might be made a flanged king bolt like said "Exhibit No. 11," or without the flanges like "Exhibit No. 10," according to the trimming dies.

I should observe that Defendants' "Exhibits No. 10 and 11" show the one (No. 11) to be considerably thicker through the rims and flanged portion than the corresponding portion "Exhibit No. 10," so that if No. 11 be trimmed in a flange die the edge around the arms and central portion would present the same thicker edge in that exhibit, that is to say, the blank from which "Exhibit No. 11" was made had more metal in the split portion, from which the arms were formed, than had the blank from which No. 10 was formed.

301st X Int. Question is repeated, with the request that the witness will answer yes or no to that portion of the question which inquires if "Exhibit No. 13" would necessarily form a flanged king bolt of the configuration of No. 11?

Ans. The forcing dies do not shape the bolt.

302d X Int. If sufficient metal in the split blank, "Exhibit No. 9," is used to fill all the cavities of the die "B, Fig. 5," of plaintiffs' reissued patent, will not the blank therein formed necessarily be of the configuration of the upper part of "Defendants' Exhibit No. 11?"

Ans. No, sir; not entirely. It would make a blank which might subsequently be trimmed to shape a like "Exhibit No. 11" before it was bent.

303d X Int. Does "Defendants' Exhibit No. 11" truly represent the bolt which it is intended in the plaintiffs' reissued patent to be formed on the dies therein described?

160 Ans. It undoubtedly correctly represents a bolt in the manufacture of which a die like "B, Fig. 5," was used in the forming operation.

304th X Int. What die or dies are used to form the flange on "Exhibit No. 11," so far as you are informed, in the plaintiffs' reissued patent?

Ans. The series of dies consisting of the forming dies, trimming dies, and the bending dies.

305th X Int. Then is it your opinion that the whole series of dies co-act to form that simple part of the bolt?

Ans. They co-act to bring it into the shape it is in the finished bolt.

306th X Int. Question is repeated, with request for a specific answer as to this part of the bolt only.

Ans. I do not find any separate operation for performing any particular part in the production of the bolt. The forming dies shape the blank, the trimming dies cut away the surplus metal which is not required in the bolt, and the bending dies bring it to its final shape.

I am aware that the specification says, in regard to the operation of bending, "such operation of causing the latter blank to be bent to the form shown in Fig. 3, and the surplus metal of the point where said arms join said body to be thrown outward and form wings or lips a^1." But this I do not consider a necessary function to be performed by those dies, because I know that the forming dies and trimming dies leave the blank in that shape if so desired, and that it would not change these dies, or invention, to make the
161 arms thicker and trim them closer, so that the bending dies might force outward to form the flanges. That would be simply a matter of judgment and not of invention. It would not change the shape in any degree of either forming or bending dies.

307th X Int. Please look at Fig. 5, plaintiffs' reissued patent, and say whether or not the lower die "B" is provided with the transverse groove or ring-like cavity, for the sole and express purpose of forming the lips or flange on the bolt "Exhibit 11." I refer you to that portion of the specification which you already quoted, and, I refer you also to the plaintiffs' original patent, "Defendants' Exhibit No. 4," and also to the file wrapper and contents in the matter of application for the plaintiffs' original patent, contained on pages 54 and 55 of defendants' printed record?

Ans. The record and original patent, as also the quotation, which I made from the reissue, show that the wings or lips, "a^1," are shaped from the metal left in the blank at the point indicated by the forming dies.

308th X Int. Is "Exhibit No. 13" a forming die?

Ans. I so understand it, in the sense that the first operation upon the split blank is called "forming operation."

309th X Int. And you have testified that whether "Exhibit No. 13" forms a flanged bolt or a non-flanged bolt depends upon the trimming of the blank by dies, or other means, afterwards; please say exactly what you mean to include under the word "trimming."

Ans. Presuming that there is sufficient metal, so that dies like "Exhibit 13" throw out sufficient metal to form a flange on
162 each side, then, the trimming dies having an opening to give the shape to the flange, the blank produced would make a flange bolt, say like "Defendants' Exhibit No. 11." But if the same blank, instead of being placed in the flanged trimming die, were

placed in a die without the flanged openings, then the flange would cut like the unflanged blank, which is here introduced and marked "Complainants' Exhibit P," that is to say, the flanged projections are cut off.

310th X Int. Is it not true that under the term trimming is strictly included only the cutting off of the fins of the blank?

Ans. The term fin implies all metal not subsequently required, *i. e.*, surplus metal, and, if an unflanged bolt was required, then that part which would form the flange is surplus, and consequently cut away.

311th X Int. Is the trimming die necessarily an essential means for forming in part the finished king bolt?

Ans. Practically yes, yet the surplus metal might be otherwise removed.

312th X Int. Do you find in the plaintiffs' reissue patent any description of trimming dies, or any reference to trimming except the words "the blank A is now relieved of its projecting fin by any suitable means"?

Ans. That is the only reference, and, to my mind, that describes trimming dies, because trimming dies are the only "suitable means" known in the art for so doing.

313th X Int. Do you find in the plaintiffs' reissued patent any dies, or other means, described for forming the collar of the bolt, and, subsequently, for drawing out the shank or stem?

163 Ans. I find that the "usual means" are to be "employed for such purpose."

314th X Int. Is the collar put upon the bolt before or after it is subjected to the operation of the die, "Fig. 6"?

Ans The description makes it a subsequent operation.

315th X Int. If I correctly understand the reissued patent, and your explanation of it, it is confined to a series of two pairs of dies for performing simply the operation of forming the head of the bolt; is not that so?

Ans. That is the second subject of claim.

316th X Int. Do the dies described in that patent form a complete and finished bolt; and, if not, what part of the operation of making the bolt do they perform?

Ans. If by "complete and finished bolts" you mean a bolt as it will be when it is placed on a carriage, I answer no, but if you mean in a condition to be sold to manufacturers of carriages, to be completed by the smith, I answer yes; because the drawing out the shank and forming the collar and threading the clip arms may be performed by the carriage smith. But, as usually sold in the market, the shank is drawn out and the collar formed as in "Defendants' Exhibit No. 11," and in Fig. 3 of the patent, leaving it for the carriage smith to shape and thread the clip arms, as in Fig. 4 of the patent, which shows the arm shaped, but not threaded.

317th X Int. Can you produce a sample of the king bolt made upon the die shown in Figs. 5 and 6 of the plaintiff's patent, in the condition it would be in, after it leaves the dies, Fig. 6?

Ans. "Exhibit K" shows such a bolt. In this case it is
164 a flange bolt. The unflanged bolt would be precisely the same, except the metal which forms the flanges would have been previously removed.

318th X Int. The lower die of Fig. 6 in plaintiff's patent is formed with recesses d^2, are they not, for the purpose of forming & receiving the lip or flange on the "Exhibit K," which you last identified?

Ans. They are necessary in the formation of a flanged bolt, and, the discription says, that the surplus metal at that point is forced into those recesses, but it will be observed that if the trimming dies do not leave this surplus metal, then these cavities would not be filled, and the result would be an unflanged bolt; as, for illustration, referring to Fig. 8, which is a cross section through the cavity "d^2," the whole space is shown as filled. Now, if the metal at the two extremes "a^1" had been previously cut away, the result would have been an unflanged bolt. Hence it is that a die may be used for making a flanged or unflanged bolt, without making any change whatever.

319th X Int. Do you find in "Defendants' Exhibit No. 1" anything corresponding to the recess "d^2," in Fig. 6, of plaintiffs' patent?

Ans. Yes, sir; there undoubtedly is, for supposing the two parts to be held together as one die, and the vertical cavity prepared to receive the shank of the blank, as it comes from the trimming die, then the arms would be bent in that die and the flanges extended along the bottom of the combined two parts. I presume, of course, that the dark space in the two parts represents only cavities to receive the arms, like the cavities "d^1," in Fig. 6, of the reissued patent.

165 320th X Int. How could this be true unless the wings or flanges were previously formed on the blank?

Ans. The wings are presumed to have been formed or shaped by the trimming dies, as I have mentioned.

321st X Int. Then "Exhibit No. 1" would not perform any part in the formation of the wing or flange?

Ans. Precisely the same, and no more, than the dies of fig. 6 in reissued patent would perform upon the same trimmed blank.

322d X Int. Do you see any substantial difference between the lower part of "Exhibit No. 1" and "Exhibit No. 8?"

Ans. Exhibit No. 8 is similar in the shape of the cavity to the cavity in "Exhibit No. 1."

323d X Int. Please state wherein consists the novelty of the device shown in Fig. 5 of the plaintiffs' reissued patent, and referred to in the first claim.

Ans. It is in a die, in one part of which a split blank may be introduced, and upon which the second part is struck to form a blank from which the king bolt may be made.

324th X Int. Can you produce a sample of a blank made by the plaintiff upon a die precisely similar to Fig. 5?

Ans. I can produce a blank made upon dies substantially like Fig.

5, and to all intents and purposes precisely like Fig. 5, and do so, Complainants' "Exhibit H" is such a blank. The dies I refer to are "Complainants' Exhibits E and F," and, as I understand it, they are precisely like the dies shown and described in the patent, in Fig. 5.

325th X Int. Do you mean to say that the die, "Exhibit F," has the transverse groove or ring-like cavities referred to and shown in the plaintiffs' original and reissued patent?

166 Ans. Yes, sir. There is no material difference, save that in "Exhibit F," the transverse section, both sides of the die are alike. In Fig. 3 of the original patent the only transverse section shewn the two sides are considerably different, but that is probably an error of the draughtsman.

326th X Int. Do you find in the die, "Exhibit F," the ring-like cavities, "a^3" of the die A, Fig. 2, of plaintiffs' original patent, described in the specification of that patent, in the second column, beginning with the words "the wings," &c.?

Ans. Fig. 2 in the original patent shows a section through the longitudinal cavities in which the arms are formed, and that cavity is identically like "Exhibit F" at the central points, or where the arms spring from the body.

327th X Int. Do you mean that "Exhibit F" has any ring-like cavities, transversely with the grooves for the arms, into which the metal to form the wings or flanges is to be forced?

Ans. Yes, sir, I do. In this that the space into which that metal is to be forced is between the upper and lower die; that is to say, the surface of the die. "Exhibit F" is, as, if the upper portion of the die, Fig. 5, were removed, it would take away the boundary or limits to which the metal might be forced, then the die would appear as in Fig. 2 of the original patent.

I understand that any space around the shank, at the head end, into which the metal may be forced to a sufficient extent to form the flanges is the cavities called for in both the original and reissued patent, and as exhibited by the produced "Complainants' Exhibit H."

328th X Int. Did you see a flange bolt made on "Complainants' Exhibit F?"

167 Ans. I saw a blank made on that die like "Exhibit H," and from which I saw a flanged bolt was made.

320th X Int. Can you produce the bolt which you saw made?

Ans. I cannot. I did not bring it away with me.

330th X Int. Are you willing to testify that it was a bolt with full flange like "Exhibit No. 11?"

Ans. I am. The flanges were as sharply and clearly defined and as large as those in the exhibit.

331st X Int. If "Exhibit F" were used, and it was desired to form a flange bolt like "No. 11," would it not be absolutely necessary to use trimming dies or other like means to cut out or shape the wings or flanges?

Ans. Yes, sir; trimming dies or other means.

332d X Int. Does not the original patent say that the wings or

flanges "are formed by pressing out the metal, heretofore described as being pressed into the ring-like cavities a^3 of the die A"?

Ans. That is a correct quotation of the process employed in the use of the dies.

333d X Int. Does not the claim of the original patent cover a series of dies for forming the wings or flanges, as well as the clip arms?

Ans. The original claim is for a series of dies A, B, C, and it is stated that they are to be used for forming clip arms, wings, &c.

334th X Int. Is there any novelty, so far as you are informed, by this patent and the testimony of this cause, which you have read, in a plain faced upper die or fuller?

168 (Objected to as it does not appear that the witness is acquainted with all that has been testified to in this case, and, if it did so appear, it would not be admissible as evidence.)

Ans. I have not read anything of the testimony concerning a fuller, or as to the novelty of a flat-faced die.

335th X Int. Question is repeated, in so far as you have examined the patents and testimony in the case?

(Same objection.)

Ans. The only flat face, of which I know anything in this case, is the upper part of Fig. 5, "Complainants' Exhibit E." Of a fuller I have no knowledge in this case.

336th X Int. In so far as it is disclosed in the original reissued patent of the plaintiffs, is there any novelty in having the upper die plain faced?

Ans. There is no claim for such novelty.

337th X Int. If "Exhibit F" is, as you say, substantially similar in construction and operation to the lower die "B, Fig. 5" of plaintiff's reissued patent, how do you reconcile the fact that the blank produced thereon, which you say is like "Exhibit H," is entirely different in shape and configuration from the blank Fig. 2, shown in the reissued patent as the product of Fig. 5?

Ans. Fig. 2 in the drawing does not show the blank just as it would come from Fig. 5; because, by no possibility could a regular shape like Fig. 2 be produced. The metal unavoidably flows outward to make irregular edges or fins. Fig. 5 shows a perspective view of the dies, which is exceedingly difficult to make with

169 any accuracy, and they are only used for convenience of illustration, and cannot be working drawings. Referring to the longitudinal section, Fig. 7, we have substantially the same shape of blank as that produced by "Complainants' Exhibit F." Fig. 2 must have been intended to represent the blank as prepared for the bending operation. In the description it is not said that Fig. 2 is as it comes from the die, that fig. being referred to, in the description of the operation, only as indicating the position of the arms, to quote, "said arms being in a line with each other, as seen in Fig. 2."

338th X Int. Please look at "Defendants' Exhibit 6," being a lower die for forming a blank, and state wherein consists the difference between it and the lower fig. 5 of the plaintiffs' reissued patent.

(Objected to by complainants' council, as assuring the "Defendants' Exhibit 6," represents a die for the forming of a king bolt; when it, in fact, appears by the evidence that it is a heading tool.)

339th X Int. "Exhibit No. 6," is not a die for forming the heads of king bolts, in the sense that that term is used in the patent, or in the sense that "Complainants' Exhibit F" is a die. No. 6 is simply a flat surface, with a hole down through it, and, no shape could be given to the arms of a split bank, the shank of which was set into the hole. There is no comparison between the two. "Exhibit F" is a die for the purpose mentioned, and "Exhibit 6," is not?

340th X Int. So far as you are informed by the plaintiff's original and reissue patent, wherein consists the novelty in the lower die Fig. 5?

170 Ans. In the fact that that die had cavities in connection with the central opening, which will bring the metal to the required shape, from which to make a blank for a king bolt.

JOHN E. EARLE.

Sworn to before me

FRANCIS G. INGERSOLL,
Notary Public.

Complainants' counsel offers certified copy, from files of Patent Office, of the testimony W. W. Knowels in the matter of the interference of Wallace *vs.* Morse, and it is maked Complainants' Exhibit R.

171 COMPLAINANTS' EXHIBIT D.

JOSIAH WILCOX,
Manufacture of Carriage Hardware and Tinmen's Hand Tools.

PORT CHESTER, N. Y., *May 24th*, 1880.

Mr. C. R. INGERSOLL.

DEAR SIR: Your letter of the 21st inst. is at hand. In reply, would say that I am not making the king bolts at present, and have not made or sold any for some time. I expect to see the owners of patent this week, and shall not use the dies mentioned till I can make arrangements with the owners. Expect to pay royalty on what bolts I have sold, and hope to make satisfactory arrangements with the owners of patent.

Very respectfully, yours,

JOSIAH WILCOX,
By G. E. WILCOX.

172 COMPLAINANT'S EXHIBIT R.

[2—175.]

DEPARTMENT OF THE INTERIOR, UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the files of

this office of the testimony of W. W. Knowles, Exhibit W, in the matter of the interference, Miller *vs.* Morse.

In testimony whereof, I, E. M. Marble, Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this tenth day of January, in the year of our Lord one thousand eight hundred and eighty-one, and of the Independence of the United States the one hundred and fifth.

[L. S.] E. M. MARBLE,
Commissioner.

173 UNITED STATES OF AMERICA.

STATE OF CONNECTICUT, }
City and County of New Haven, } *ss:*

By this public instrument be it known to all whom the same doth or may in any manner concern, that I, Henry Rogers, a notary public in and for the State of Connecticut, by letters patent, under the great seal of the said State, duly commissioned and sworn, dwelling in the city and county aforesaid, in the aforesaid State, do hereby certify that pursuant to notice previously given by John E. Earle, attorney for F. B. Morse, on the 5th day of January, 1870, to R. R. Miller, in the matter of the interference declared by the Commissioner of Patents the — day of ——, 186–, between the application of F. B. Morse and the application of R. R. Miller for improvement in dies for forging king bolts, which notice was duly served upon said R. R. Miller on the 5th day of January, A. D. 1870, as will more fully appear by the original copy of said notice, with proof of service of the same which is hereto annexed. I was attended on the 6th day of January, A. D. 1870, by John E. Earle, Esq., attorney for F. B. Morse, by H. R. Bradley, Esq., counsel for R. R. Miller, and by said R. R. Miller himself (at the time and place mentioned in said annexed notice) and by the witness named in the caption, and whose testimony is hereto annexed, who
174 was of sound mind and lawful age, and the said witness was by me first carefully examined and cautioned, and sworn to tell the truth, the whole truth, and nothing but the truth, and the deposition was by me reduced to writing in the presence of the said witness, and from his statements; and, after carefully reading the same to the said witness, he subscribed the same in my presence. I have retained the said deposition in my possession for the purpose of transmitting the same, with my own hand, to the Honorable Commissioner of Patents. Said deposition is taken at the request of said F. B. Morse, to be used upon the hearing of said interference before the Commissioner of Patents.

I further certify that I am not of counsel nor attorney for either of the parties in said depositions and caption named, nor in any way interested in the event of the cause named in said caption.

In testimony whereof, I, the said notary public, have subscribed my name, and caused my notarial seal of office to be hereunto affixed the 6th day of January, in the year of our Lord one thousand eight hundred and seventy.

[L. S.] HENRY ROGERS,
Notary Public.

175 Before the Hon. Commissioner of Patents.

In the Matter of the Interference declared between the Application of F. B. Morse and the Application of R. R. Miller, for Improvement in Dies for Forging King Bolts.

Take notice, I shall proceed to take testimony on the part of F. B. Morse, to be used in evidence at the hearing in the above-entitled interference, at my office, 350 Chapel street, in the city of New Haven, on Thursday, the 6th day of January, 1870, at 2 o'clock p. m. of that day, and continue by adjournment, if necessary.

You are invited to be present and cross-examine the witness, if it be your pleasure so to do.

The witnesses are W. W. Knowles, F. B. Morse, Perley N. Lowe, O. A. Hitchcock, H. M. Beecher.

Respectfully,

JOHN E. EARLE,
Attorney for F. B. Morse.

To R. R. MILLER, Esq., *Plantsville, Conn.*

176 COUNTY OF HARTFORD, *State of Connecticut:*

On this 5th day of January, 1870, before me personally came Daniel Tuttle, and made oath that he served the above notice on R. R. Miller by leaving with him a true copy of the same this day.

WALTER S. MERRILL,
Justice of the Peace.

177 Before the Hon. Commissioner of Patents.

In the Matter of the Interference declared between the Application of F. B. Morse, for Improvement in Dies for Forging King Bolts, and the Application of R. R. Miller for a similar invention.

Rebutting testimony taken before me, Henry Rogers, a notary public for the State of Connecticut, on this 6th day of January, A. D. 1870, on behalf of the said F. B. Morse, pursuant to the notice hereto annexed, and at the time and place therein designated.

Present: John E. Earle, Esq., attorney for the said F. B. Morse; H. R. Bradley, Esq., counsel for the said R. R. Miller, and R. R. Miller, himself.

Deposition of Witness.

WILSON W. KNOWLES, being first duly cautioned and sworn, in answer to interrogatories propounded by JOHN E. EARLE, Esq., answered as follows:

1st Interrogatory. What is your name, age, residence and occupation?

Ans. Wilson W. Knowles; age, 35; residence, Southington; occupation, blacksmith.

2d Int. Please state where and in what capacity you have been employed during the last eighteen months.

Ans. I have been foreman of H. D. Smith & Co.'s forging shop up to November 8th or 9th, 1869.

178 3d Int. In that capacity, were you, or were you not, familiar with the manufacture of articles in that shop?

Ans. I was.

4th Int. Please examine Fig. "6," Exhibit "W," and state if you know what that figure represents, and if you have ever seen articles represented by that figure?

Ans. It is a king bolt; I have seen articles as represented in that figure.

5th Int. Where and when?

Ans. I should say in H. D. Smith & Co.'s forging shop, in June or July, 1869.

6th Int. State, if you know, by whom the bolt or bolts you saw in June or July, 1869, were made?

Ans. By R. R. Miller.

7th Int. Were there, or were there not, bolts like Fig. "6," Exhibit "W," made in this shop prior to June, 1869?

Ans. I have no recollection of seeing any.

8th Int. Had such bolts been produced in the shop of which you were foreman, would you or would you not have known of it?

Ans. If there had been any great quantity I think I should have known it.

9th Int. Please examine Exhibit "T," and state if you know what it is, and where made?

Ans. I do; it is a king bolt, made in H. D. Smith & Co.'s forging shop.

10th Int. When were bolts of this description first made in H. D. Smith & Co.'s shop?

Ans. I should say in January, 1869.

11th Int. Between January, 1869, and June or July, when
179 you say you first saw king bolts like Fig. "6," Exhibit "W," were bolts like Exhibit "T" made in any quantity; and, if yea, state about how many?

Ans. I should say they were not made in any quantity; there might have been five or six bolts made, like Exhibit "T."

12th Int. Have such bolts since been made, and to what extent?

Ans. They have. I should judge to the extent of ten or twelve hundred.

13th Int. Are you, or are you not, positive that this quantity of bolts, or a large portion of them, were not made prior to the first of June, 1869?

Ans. I am not positive.

(Direct examination closed.)

Cross-interrogatories propounded by H. R. BRADLEY, Esq., counsel for R. R. Miller:

1st X Int. Might, or might there not, have been king bolts like Fig. "6," Exhibit "W," made in H. D. Smith & Co.'s forging shop previous to January 1st, 1869?

Ans. There might have been.

2d X Int. Can you swear positively that there were not at least

fifteen hundred blanks or king bolts like Fig. "6," Exhibit "W," made in H. D. Smith & Co.'s forging shop prior to June, 1869?

Ans. I should say there were at least fifteen hundred blanks made there for king bolts for Smith's perch and bed plate.

180 3d X Int. Could not those blanks you speak of make a king bolt like Fig. "6," Exhibit "W"?

Ans. They could.

(Cross-examination closed.)

Redirect:

1st R'd. Int. Could not those blanks, from which say king bolts like Fig. "6" might be made, be also used for making other clips for carriages, as for other parts of carriage hardware?

Ans. I should say not, practically.

(Examination closed.)

WILSON W. KNOWLES.

(Rebutting testimony closed.)

[L. S.] HENRY ROGERS,
Notary Public.

Ex'd: S. P. P.
C. F.

180½ And on the 11th day of June, A. D. 1881, the said cause was fully argued by counsel for the respective parties before said circuit court, and on the 21st day of July, A. D. 1881, the following opinion of court was filed therein, viz:

181 Circuit Court of the United States for the District of Connecticut.

THE ATWATER MANUFACTURING COMPANY, JULIUS B. SAVAGE, & ROBERT R. MILLER
v.
THE BEECHER MANUFACTURING COMPANY.

SHIPMAN, J.:

This is a bill in equity founded upon the infringement of reissued letters patent No. 8694, issued May 6th, 1869, to Robert R. Miller, assignor, to the plaintiff, for improvement in dies for forming the heads of king bolts for wagons. The original patent was issued to Miller February 22d, 1870.

The patented dies consist of two pairs—one for forming and the other for bending the blank. The two claims of the reissued patent are as follows:

"1. The die B *b b'* and the die C, constructed and combined substantially as and for the purpose shown.

"2. The series of dies B, C, D, and E, for forming clip king
182 bolts, substantially as shown and described."

The first claim relates to the forming dies; the second to the series of dies.

Infringement of both claims was clearly proved. The attempts

by the defendant to disprove infringement and novelty of invention were alike unsatisfactory.

The only question of importance in the case relates to the validity of the first claim of the reissued patent. In the specification of the original patent the patentee said: "If (my invention) consists in the series of dies constructed and operating as hereinafter more fully described;" and "I wish it to be understood that I do not claim either of the dies hereinafter described separately." The original claim was for "the series of dies A, B, and C," &c. In the reissue the patentee says: "It (the invention) consists principally in the forming dies constructed in the manner substantially as hereinafter shown." The specification of the reissue omits the disclaimer which has just been quoted.

183 The original application was filed July 31st, 1869, and was for the forming and bending dies, but not as a series. On October 9th, 1869, an interference was declared between Miller's claim for the dies B and C (the bending dies) and the first claim in F. B. Morse's application. On Feb'y 5th, 1870, Miller's application was amended by inserting in the statement of the invention "series of" before "dies," and by inserting before the claim the sentence which has been quoted: "I wish it to be understood," &c.; and by inserting in the claim the words "series of" before "dies." The interference was dissolved February 2d, 1870, and on February 5th the application passed for issue. A patent was also issued on February 22d, 1870, to F. B. Morse, but it has not been placed in evidence.

The evidence in the record is too scanty to bring this case within the doubts expressed by the Supreme Court in Leggett *v.* Avery, 101 U. S., 256, and Goodyear Vulcanite Co. *v.* Davis, 102 U. S., 222.

184 There is no sufficient evidence upon which to base a finding that the disclaimer was made in order to obtain the issue of the patent, for it was far broader than was necessary to adjust by compromise the interference controversy, which related solely to the bending dies.

The question at issue here is whether, in this case, the insertion of a claim in the reissue for the forming dies was the insertion of new matter in view of the fact that the original patent declared the invention to consist in a series of dies, and formally disclaimed the invention of dies separately, although it is apparent from the testimony in regard to novelty that the forming dies were the invention of the patentee. The section upon the subject of reissues prohibits the introduction of "new matter" into the specification, even though the new matter was the invention of the patentee, and was inadvertently omitted from the original application. If the matter is "new" the patentee cannot obtain by a reissue the benefit of that

185 part of his invention, and must make a new application, in which case he will be subject to the rights of other inventors and of the public. Mr. Justice Bradley, speaking for the court in Powder Co. *v.* Powder Works, 98 U. S., 126, says, in language evidently used with care: "The Legislature was willing to concede to the patentee the right to amend his specification, so as

fully to describe and claim the very invention attempted to be secured by his original patent, and which was not fully secured thereby in consequence of inadvertence, accident, or mistake; but was not willing to give him the right to patch up his patent by the addition of other inventions, which, although they might be his, had not been applied for by him, or, if applied for, had been abandoned or waived."

In this case the description of the original patent said that the invention did not consist in what the reissue now says it did consist. The original patent carefully excluded the part which the reissue says is the principal portion of the invention. I do not mean to say, as matter of law, that an untruthful disclaimer, inad-
186 vertently made, of a minor part or detail of an invention can never be disclaimed, but I simply say that a comparison of the original and reissued patents in this case shows that new matter was inserted in the reissue, the comparison showing that the amendments which were introduced into the reissue substantially changed the character of the invention which was the subject of the original specification, because they reclaimed an important part of the invention which had once been applied for, and thereafter had been formally waived.

The other criticisms which were made by the defendant upon the reissue do not seem to me to be important.

The second claim is valid and has been infringed. When the plaintiffs shall have presented to the court satisfactory evidence that they have filed a proper disclaimer of what is claimed by the first claim of the reissue, they will be entitled to a decree for a perpetual injunction and an account of profits and damages as respects
187 the second claim of the reissue, but without costs. (Schillinger *v.* Gunther, 17 Blatchf. C. C. R., 66.)

CHARLES R. INGERSOLL AND
GEORGE S. PRINDLE,
For the Plaintiffs.
HECTOR T. FENTON,
For the Defendant.

188 And on the 8th day of August, A. D. 1881, the following interlocutory decree was made and entered in said cause, viz.:

At a stated term of the circuit court of the United States for the district of Connecticut, held at New Haven, in and for said district, on the fourth Tuesday of April, 1881,

Present: Hon. Nathaniel Shipman, judge.

THE ATWATER MANUFACTURING COMPANY *et al.*
v.
THE BEECHER MANUFACTURING COMPANY. } In Equity.

This cause came on to be heard at the April term of this court upon the pleadings and proofs. After hearing counsel for the respective parties, and after due proceedings had, it is upon consideration ordered, adjudged, and decreed:

That the letters patent of the United States originally issued to Robert R. Miller and Julius B. Savage, assignees of Robert R. Miller, dated Feb. 22, 1870, No. 100,053, for an improved series
189 of dies for forming the heads of king bolts, and reissued to the complainants, The Atwater Manufacturing Company, Julius B. Savage, and Robert R. Miller, as assignees of said Miller, May 6, 1879, No. 8694, are good and valid in law, a proper disclaimer having been made in accordance with the opinion of this court, filed July 21, 1881.

That the said Robert R. Miller was the first and original inventor and discoverer of the invention described and claimed in said reissued letters patent No. 8694, and that the complainants are the exclusive owners of said reissued letters patent.

That the defendant, The Beecher Manufacturing Company, has infringed upon said reissued letters patent and upon the exclusive rights of the complainants under the same; that is to say, by using, without right or license, in the manufacture of king bolts made and sold by it, the series of dies described in the claim of said reissued letters patent as the series of dies B, C, D, and E, for forming clip king bolts.

And it is further ordered, adjudged, and decreed—

190 That the complainants do recover of the defendant the profits, gains, and advantages which the said defendant has derived, received, or made by reason of the said infringement of the complainants' patent, by any manufacture, use, or sale, and that the complainants do also recover any and all damages they have sustained by reason of any such infringement of said letters patent by the defendant.

And it is hereby referred to E. E. Marvin, Esq., of Hartford, as master, he having been agreed to by the parties, which, in addition to his qualifications, is an adequate and special reason for his appointment to take and state the account of said gains, profits, and advantages, and to assess such damages, and to report thereon with all convenient speed. And the defendant and its officers are hereby directed and required to attend, before said master, from time to time, as required, and to produce before him such books, papers, and documents as relate the matters at issue, and to submit to such oral examination as the master may require.

191 And it is further ordered, adjudged, and decreed that a perpetual injunction issue out of and under the seal of this court enjoining and restraining the defendant and its officers, associates, clerks, agents, servants, and workmen, from directly or indirectly making, or causing to be made, using, or causing to be used, or vending to others to be used, and dies made or constructed as the dies heretofore used by the defendant containing or embodying the invention described and claimed in said reissued letters patent, to wit, the series of dies for forming clip king bolts as therein substantially shown and described, or from infringing said letters patent in any way whatsoever.

And all further questions are reserved until the coming in of the master's report.

N. SHIPMAN,
District Judge.

The above seems to be in accordance with the opinion of the court filed July 21, 1881.

H. T. FENTON,
For Def't.

Aug. 5, '81.

192 And on the 3d day of February, 1882, master's report was filed in words and figures following, viz:

Master's Report.

United States Circuit Court, District of Connecticut. In Equity.

THE ATWATER MANUFACTURING COMPANY, JULIUS B. SAVAGE, & ROB'T R. MILLER, Complainants,
vs.
THE BEECHER MANUFACTURING COMPANY, Respondent.

The undersigned, to whom has been committed the labor of ascertaining and reporting to the court the profits, gains, and advantages which the defendant herein has derived, received, or made, by reason of its infringement of the series of dies B, C, & D, E, for opening and forming clip king bolts, named and described in the reissued letters patent granted to the complainants, as the assignee of Rob't R. Miller, May 7, 1879, and numbered No. 8694, in the manufacture of such clip king bolts at its shops at Meriden, from and after the 6th day of May, A. D. 1879, and up to and including the 8th day of August, A. D. 1881, would respectfully report that he finds as follows, viz:

193 That the defendant made at said shops, during said period, by means of the defendant's dies, Nos. 1 and 13, used as a series, and in infringement of the complainants' dies B, C, & D, E, 100,509, plain clip king bolts.

That there has been no proof of profits and gains to the defendant by reason of such infringement presented before the master, only as such profits and gains have accrued to it by reason of its savings of labor in the two steps of opening and forming the clips of clip king bolts, as compared with any other process of manufacture for that purpose open to it to employ.

That at this time the opening and bending of the clip arms of clip king bolts by dies was covered by the said patent to the complainants, and also by one to F. B. Morse, dated Feb. 22, 1870, so that the best method disclosed by the evidence open for the defendant to employ in the making of clip king bolts at the time of the said infringement was that method employed at the shops of Josiah Wilcox, at Port Chester, New York, prior to 1870, and which employed the common blacksmith's tools, such as anvil, tongs, hammer, sledge, fuller swedges, chisel, a foot vise, and heading tool, by means of

which the head of the bolt and the base of the clip arms were
194 forged and formed to some slight extent by hand and foot, and by the use of which method a man and helper, according to Leander Burns, could forge one hundred bolts in a day, or, according to George E. Wilcox, from one hundred and twenty to one hundred and forty-four.

Considering the evidence of these two witnesses together, for reasons apparent in the record, I find the average manufacture of clip spring bolts at Wilcox's prior to 1870, by the device above named, to have been one hundred bolts per day, as stated by Burns.

By the methods employed at H. D. Smith & Co. and at J. B. Savage's, in Southington, prior to the use of the Miller or Morse dies, no method was devised by which more than from seventy-five to ninety bolts could be forged in a day by a man and helper.

As to the cost, however, of making these clip king bolts which were made at Wilcox's prior to 1870, at the average daily rate of one hundred per day, there is no direct evidence.

Miller, however, made them at the shop of H. D. Smith & Co. during the same period, with instrumentalities less advanced, at $5 per hundred. Making them solely by hand during the same period, they cost from $6 to $10 per hundred.

195 Comparing the evidence put in on this subject, I find it would have cost the defendant by the best method open for them to adopt, being the one in practice at Wilcox's just prior to 1870, by the use of which one hundred clip king bolts could be forged in a day, during the period covered by the accounting for the labor of making one hundred of these bolts, as much with whatever of advanced mechanism he pursued, as the work of Miller per day, who was making eighty bolts per day for H. D. Smith & Co. for the price of $5 per hundred, which would be $4.

To this should be added 25 cts. per hundred proved to be the proper allowance for the wear and tear of tools, which would make an inferior class of bolt by this method cost the defendant $4.25.

But such bolts, I understand from the evidence, could not have met the defendant's demand; they would not have sold in the market, and one witness says they could not have been given away as against a die-made bolt, and at the very best estimate of their value that appears in the evidence; throwing out that of Wilcox, they would not sell in the market for as much as die-made bolts, into fifty cents a dozen, or $4.00 per hundred.

But precisely what sum should be added to their cost as
196 completed by the Wilcox's best method to cover the cost of labor to make them as valuable and marketable as those covered by this accounting, perhaps is not capable of strict proof. The profits on the articles of manufacture seems to be large, and a comparison of selling prices and a regulation of costs thereby, though not unerring, as the defendant has chosen to conceal the actual cost, is perhaps the only basis upon which an estimate can be made.

It will be found in the testimony that die-made bolts now costing for the labor upon them $3.20 per hundred sell for $12.00 per hundred; that is, the cost of the whole labor is 26 per cent. of the selling

And all further questions are reserved until the coming in of the master's report.

N. SHIPMAN,
District Judge.

The above seems to be in accordance with the opinion of the court filed July 21, 1881.

H. T. FENTON,
Aug. 5, '81. *For Def't.*

192 And on the 3d day of February, 1882, master's report was filed in words and figures following, viz:

Master's Report.

United States Circuit Court, District of Connecticut. In Equity.

THE ATWATER MANUFACTURING COMPANY, JULIUS B. SAVAGE, & ROB'T R. MILLER, Complainants,

vs.

THE BEECHER MANUFACTURING COMPANY, Respondent.

The undersigned, to whom has been committed the labor of ascertaining and reporting to the court the profits, gains, and advantages which the defendant herein has derived, received, or made, by reason of its infringement of the series of dies B, C, & D, E, for opening and forming clip king bolts, named and described in the reissued letters patent granted to the complainants, as the assignee of Rob't R. Miller, May 7, 1879, and numbered No. 8694, in the manufacture of such clip king bolts at its shops at Meriden, from and after the 6th day of May, A. D. 1879, and up to and including the 8th day of August, A. D. 1881, would respectfully report that he finds as follows, viz:

193 That the defendant made at said shops, during said period, by means of the defendant's dies, Nos. 1 and 13, used as a series, and in infringement of the complainants' dies B, C, & D, E, 100,509, plain clip king bolts.

That there has been no proof of profits and gains to the defendant by reason of such infringement presented before the master, only as such profits and gains have accrued to it by reason of its savings of labor in the two steps of opening and forming the clips of clip king bolts, as compared with any other process of manufacture for that purpose open to it to employ.

That at this time the opening and bending of the clip arms of clip king bolts by dies was covered by the said patent to the complainants, and also by one to F. B. Morse, dated Feb. 22, 1870, so that the best method disclosed by the evidence open for the defendant to employ in the making of clip king bolts at the time of the said infringement was that method employed at the shops of Josiah Wilcox, at Port Chester, New York, prior to 1870, and which employed the common blacksmith's tools, such as anvil, tongs, hammer, sledge, fuller swedges, chisel, a foot vise, and heading tool, by means of

which the head of the bolt and the base of the clip arms were
194 forged and formed to some slight extent by hand and foot, and by the use of which method a man and helper, according to Leander Burns, could forge one hundred bolts in a day, or, according to George E. Wilcox, from one hundred and twenty to one hundred and forty-four.

Considering the evidence of these two witnesses together, for reasons apparent in the record, I find the average manufacture of clip spring bolts at Wilcox's prior to 1870, by the device above named, to have been one hundred bolts per day, as stated by Burns.

By the methods employed at H. D. Smith & Co. and at J. B. Savage's, in Southington, prior to the use of the Miller or Morse dies, no method was devised by which more than from seventy-five to ninety bolts could be forged in a day by a man and helper.

As to the cost, however, of making these clip king bolts which were made at Wilcox's prior to 1870, at the average daily rate of one hundred per day, there is no direct evidence.

Miller, however, made them at the shop of H. D. Smith & Co. during the same period, with instrumentalities less advanced, at $5 per hundred. Making them solely by hand during the same period, they cost from $6 to $10 per hundred.

195 Comparing the evidence put in on this subject, I find it would have cost the defendant by the best method open for them to adopt, being the one in practice at Wilcox's just prior to 1870, by the use of which one hundred clip king bolts could be forged in a day, during the period covered by the accounting for the labor of making one hundred of these bolts, as much with whatever of advanced mechanism he pursued, as the work of Miller per day, who was making eighty bolts per day for H. D. Smith & Co. for the price of $5 per hundred, which would be $4.

To this should be added 25 cts. per hundred proved to be the proper allowance for the wear and tear of tools, which would make an inferior class of bolt by this method cost the defendant $4.25.

But such bolts, I understand from the evidence, could not have met the defendant's demand; they would not have sold in the market, and one witness says they could not have been given away as against a die-made bolt, and at the very best estimate of their value that appears in the evidence; throwing out that of Wilcox, they would not sell in the market for as much as die-made bolts, into fifty cents a dozen, or $4.00 per hundred.

196 But precisely what sum should be added to their cost as completed by the Wilcox's best method to cover the cost of labor to make them as valuable and marketable as those covered by this accounting, perhaps is not capable of strict proof. The profits on the articles of manufacture seems to be large, and a comparison of selling prices and a regulation of costs thereby, though not unerring, as the defendant has chosen to conceal the actual cost, is perhaps the only basis upon which an estimate can be made.

It will be found in the testimony that die-made bolts now costing for the labor upon them $3.20 per hundred sell for $12.00 per hundred; that is, the cost of the whole labor is 26 per cent. of the selling

price. Mr. Smith says of such bolts as the defendant would be able to make by Wilcox's best method, that they would not sell for as much as a die-made bolt into $4.00 per hundred, and the whole evidence shows that they would not be as good or salable, and I find that 26 per cent. of the $4.00 per hundred, that they would lack in salability, as compared with the die-made bolts, would be needed to be added to their cost in finishing labor to make them as good and salable as those the defendant did obtain by the use of the complainants' devices covered by this accounting.

197 This would be $1.00, and would have made the bolts (as good as the defendant did in fact obtain, & made by the very best process open to it to employ) cost it for the labor thereon $5.29 at the very least deduction that can be made from the facts furnished by the evidence.

But the defendant says that the hand process and the best methods at Wilcox's and Savage's were not the best methods open to it prior to the adoption of the Miller and Morse dies. It says it could not only have employed all these at its free election, but beyond that it could have freely adopted either the opening and forming die of the complainants' patent, or the bending die alone, and by such adoption, in connection with all said other instrumentalities open to the public, could have made as good a bolt as those it actually did make with little or no extra labor.

It is a matter of some doubt whether of two dies covered to the complainants to be used in a particular series for making a particular article either one of them can be adopted as the most valuable part of another series for making the same article without

198 infringement of such complainants' rights; but while it may be possible that such a claim may be sound as to the Miller patent, said Miller having disclaimed both his opening and forming and his bending die when used alone, I find with regard to either of these partial steps as I have already found in regard to them as a series, taken together, that they were covered by the Morse patent of Feb. 22, 1870, and were consequently not open to the public.

The interference declared between the patents of Miller and Morse seems to have been adjusted by compromise, and the patents being issued upon the same day, were doubtless expected, taken together, to cover all devices for either opening and forming or bending the clip arms of clip king bolts by dies, and while it is true that the court in the main case seems to have considered Miller to have been the prior inventor of dies for both these particular steps, it did not necessarily adjudicate the Morse patent of Feb. 22, 1870, to be invalid, because a device combining the two steps of the Miller process into one step might still be a valuable improvement and

199 the patent therefore valid, and I find that the defendant's clamp die No. 1, when used either to form or bend the arms of clip king bolts, or to do both steps in one act, is undoubtedly used in infringement of the Morse patent of Feb. 22, 1870, if not of that of the Miller, and was, therefore, not available to it for such purpose, or for any defence of any step, or of the use of any one step of the complainants' series for any one or more of the processes

necessary for making the clip arms of the king bolts covered by this accounting.

As to how much the defendant saved by using the complainants' process and dies for the two steps of forming and bending the clip arms of the bolt, the proof is mainly by comparison with the savings of other manufacturers doing the same work in the same way. It cost Wilcox $4.25 cts. a hundred for the labor to make inferior bolts using the advanced instrumentalities possessed by him prior to 1870, and which I find to be the best instrumentalities disclosed by the evidence in this case open for the defendant to employ.

Afterwards adopting in addition thereto the complainants' dies for forming and bending the clips, the labor on the other steps remaining the same, the same help being employed at the same price,
200 he turned off twice as many.

The hundred first made need $1.04 in work to make them as good as the infringing bolts as before computed making their total cost $5 29 cts. per hundred.

The two hundred last made, adding for wear and tear of dies, power, eighty cents per hundred, as estimated by Capt. Savage, cost $2.80 per hundred, a gain of $2.49 per hundred.

Capt. Savage says that a man and helper at $3.25 per day could turn off by hand before the Miller dies were used the heads or clip arms (about one-half the work in making the bolt) of from 75 to 80 bolts in a day.

Taking the larger number to be the daily average product that would be $4 per hundred or $8 for the whole work, and adding 25 cts. for wear and tear of tools, $8 25 cts.

By the use of the Miller dies, in addition to the old instrumentalities, 2½ men at $2 per day each, could turn off from 300 to 325 completed bolts, taking the larger number as before to be the daily average, and 80 cts. per hundred for wear and tear, power, etc., the 325 bolts would cost $7.60 or $2.34 cts. per hundred, a gain of $5.91 over hand-work.

201 Miller, working for H. D. Smith & Co., before inventing his dies made these clip king bolts, at the rate of from 75 to 80 per day, for $5 per day, or $4 per hundred, which, with the wear and tear of dies at 25 cents, made the cost to the manufacturer, as to labor $5.25 per hundred; and he further says that one man alone, by the use of his dies, can make from 150 to 175 per day from the rod.

Taking his average of the daily manufacture, being 162 bolts, and adding to the men's wages of $2, as before computed, 80 cts. for the wear and tear, power, etc., the bolts would cost $2 per hundred, and we have a gain of $3.25 per hundred over the bolts made at H. D. Smith's in 1869, just prior to the use of the Miller dies.

H. D. Smith says the work on the clips performed by the patented dies when done by hand would cost $5.62 per hundred, and by the dies costs only $1.50, a gain of $4.12 per hundred over hand work.

Miller says by hand forging he got out 40 or 50 entirely by hand per day, and that the bolts cost $12.50 per hundred.

Afterwards he got them out at H. D. Smith's, partly by drop,
202 foot-vice, and blacksmiths' tools, similar to Wilcox best instrumentalities, prior to the use of the dies, for $5.25 per hundred, a gain of $7.25 over hand forging.

Summing up three comparisons I find that the whole bolt work as performed at Wilcox's employing the Miller dies costs $2.80 per hundred.

By Miller's estimate, $2 per hundred.

By Savage's estimate, $2.34 per hundred.

By Savage's statement or actual cost to him of the whole work on clip king bolts, being precisely the same work that the defendants did to make their infringing bolts, $3.03.

By Webster's statement of actual cost of same work to the complainants', increased by Capt. Savage's estimate of wear and tear, power, etc., $3.37.

The average cost of the die made bolts by the use of the Miller dies, as to the labor, comparing the five methods above given of arriving at it, is $2.75 per hundred, but as I am satisfied that the two latter methods are the most exact, I shall adopt them, and upon comparing them together that the entire cost of all the labor in making clip king bolts by the use of the Miller dies to the defendant was $3.20 per hundred.

203 As to the cost of opening and bending the clip arms alone Savage makes it $1.50, so does H. D. Smith and Webster, and M'Enery increases this by stating that the work at defendant's shop on the clip arms under the system using the Miller dies was a little over half, and I therefore find that the work of the defendant upon the clip arms of the bolts performed by the dies No. 1 and No. 13 was one half of the whole work upon the bolt, or $1.60 per hundred.

The other steps performed by the defendant in making its bolts have cost substantially the same as the same work done for the other manufacturers, with whose work comparisons have been instituted herein and has not varied materially during the last three years.

Deducting $1.60, the cost of handwork and instrumentalities which were open and free for the defendant to use in making the infringing bolts, from $5.29, what I have found it would have cost it to have made as good bolts as it did make, using the best instrumentalities open for it to employ, I have $3.69 of that cost left, which is the amount the work in fact performed by the Miller dies
204 would have cost it, had that labor been performed any other way that it could have adopted, which is disclosed in the testimony on file in this case.

Deducting from this amount the cost of doing this work by the Miller dies, as before ascertained, and we have $2.09 per hundred remaining as its savings by such use.

This upon the 100,509 clip king bolts, which it admits it has made within the period covered by the accounting by the use of

said complainants' series of dies, B, C, & D, E, amounts to $2,100.64, which amount I find it has saved by such use.

Submitted Feb. 4, 1881.

E. E. MARVIN,
Master pro hac vice.

Fees.

Aug. 13, making notice and copies	$5 12
Aug. 15, making supplemental do	5 12
Sept. 15, 16, 19, 23, Nov. 14, Dec. 12, 13, Jan. 5, 23, 8½ days taking evidence and extending account of bolts & footing at $15 per day	127 50
Cash paid expenses, telegraph, and express on exhibits	22 01
Making report	120 00
	$279 75

205 And on the same day evidence before master was filed in the words and figures following, viz:

U. S. Circuit Court, District of Connecticut.

ATWATER MANUF'Y CO. *vs.* BEECHER MANUF'Y CO. } In Equity.

Accounting before E. E. Marvin, master, at Mr. Ingersoll's office, New Haven, Sept. 15th, 1881. Messrs. Ingersoll and Prindle present for compl'ts, and Mr. Fenton for defendant.

Defendant, in reply to order of master, produces a statement and account such as is called for by the original order, and which is made by Mr. Daniel F. Southwick, secretary of def't, which is marked Exhibit Defendant's Account.

It is consented that the complainants' application for so much of the order of the master as is embraced in paragraphs 2 & 3 of master's order of August 15th, 1881, and def't's objection thereto are laid over for future action.

The compl'ts are not satisfied that the Exhibit Def't's Account is entirely correct, and desire it to be verified.

Account verified by oath of Mr. Southwick.

206 Cross-examination of Mr. SOUTHWICK by Mr. INGERSOLL upon the account:

1. I ascertained from my books this number of clipped king bolts as made during said periods; it comprises all that we made by dies since May 6th, 1879; it does not represent what we have sold; we have bought from three or four parties; I could not give the number we have bought; I could only estimate it; I think 12,000; we buy all flanged king bolts, and some few plain; this statement was taken from the time-book; all were made by the piece; we have a clerk whose business it is to count all that are made, and enter it on the time-book, and I took this from the time-book myself—ourselves;

that book has a true record of all that is made up; there is 1,000 No. 4 bolts in that account which is estimated by me; it is made up just before monthly pay day on large time-book; the large time-book, large enough to last us three or four years, made up from several smaller time-books, contains the names of all laborers making bolts; have no salesroom anywhere; have a shipping
207 room at Meriden; sales-book would tell all we had sold but not all we have made, because we have many on hand.

(Compl'ts give notice that they want the big time-book produced.)

Adjourned to defendant's office, Meriden, September 16th, 10 a.m.

MERIDEN, *Sept.* 16, 1881.

Accounting continued at def't's office.

Mr. Prindle present for compl'ts; def't present by its president & secretary.

After comparing the defendant's statement with their book of sales the master finds that def't sold from May 6, 1879, to Aug. 8, 1881, 8,770 flange king bolts, 1,054 No. 4 bolts and 74,052 plain king bolts, which, taken with the number on hand ready for sale, shows def't's account of clip king bolts manufactured to be substantially correct.

NEW HAVEN, *Sept. 23rd*, 1881.

Accounting continued at Mr. Ingersoll's office.

Mr. Ingersoll and Mr. Pringle present for complainants, and Mr. Fenton for the defendant.

Examination of Mr. SOUTHWICK resumed:

We did not make any of the flange bolts in the master's account taken; we purchased them.

1. In verification of the account produced, will you please state the number of bolts you had on hand at date of decree, including those made and those purchased by you?

A. I can state the number we had July 1st, 1881; we had 31,265 plain bolts, 304 flanged.

208 2. In further verification of the account produced, will you please state the number of bolts you had on hand at the date of the reissued patent May 6th, 1879?

A. I can state the number we had on hand July 1st, 1879. 3,088 plain, 1,696 flanged.

3. Does your last answer include those both made and purchased by you prior to that date?

A. Yes, sir.

4. Will you please state the number of bolts that you purchased between May 6th, 1879, and August 7th, 1881?

A. 2,964 plain and 9,370 flanged.

Evidence for Complainants.

Mr. GEORGE F. SMITH was sworn and examined by Mr. INGERSOLL:

1. What is your age, name, residence, and occupation?

209 A. My name is George F. Smith; age, 49; residence, Plantsville, Connecticut; business, manufacturer of carriage hardware.

2. Have you had any experience in the manufacture of clip king bolts; and, if so, state what?

A. Yes, sir; I have been engaged in the manufacture of clip king bolts since 1868, possibly earlier, as a member of the firm of H. D. Smith & Co., of Plantsville, Connecticut.

3. Are you acquainted with the operation of the dies patented to R. R. Miller for making the head of king bolts, and as used by the complainants in their manufacture?

A. Yes, sir; I am.

4. Looking at that portion of the manufacture of clip king bolts which is performed by the Miller dies—that is to say, the work from the split blank, not including such split, to the point where the blank comes from the bending die, as represented by the ex-
210 hibit now presented to you—please state what, in your opinion, is the cost to the manufacturer of that operation in the case of a plain bolt, giving your reasons for that opinion.

(Exhibit referred to put in evidence and marked Master's Exhibit A.)

(Defendant's solicitor objects to the question, because the operation as detailed in the question is not wholly performed by the patented dies, as appears on an inspection of the reissued patent, and because there is an intermediate process performed by trimming dies, which the record in this cause shows is in no manner connected with the patented claim.)

(Objection overruled and exception taken.)

A. A cent and a half apiece, or eighteen cents a dozen.

(Complainants' counsel also puts in evidence the split blank referred to in his last question, which is marked Master's Exhibit B.)

5. State how you arrive at the result given in your last answer.

211 A. By estimates of the cost of that part of the king bolt by dies similar in nature used by ourselves.

6. What are the items of cost comprised in that estimate?

A. Labor and the expense of making and repairing dies for that part of the work.

7. What do you estimate the labor?

A. About twelve cents a dozen; dies six cents a dozen.

8. What, in your opinion, would be the cost to the manufacturer if the same work was done by hand forging?

(Complainants object to the question, because it must be shown affirmatively by the complainants that the process of hand forging is the next best process open to the defendants to produce the same result, and such proof has not yet been offered.)

(Overruled and exception taken.)

A. In my opinion, it would cost about sixty-five (65) cents a dozen.

212 9. Please give your reasons for this opinion.

A. My reasons are that I judge a man could do that part of the work on from 45 to 50 of them in a day, and that a man who could do that work would cost $2.50 per day.

10. Before this article of clip king bolts was made by dies, such as those referred to by you, how were they made?

A. So far as I know, the clips were forged by hand.

11. Since the introduction of dies into this manufacture, has or not that mode of manufacture superseded the mode by hand forging?

A. It has, so far as I have any knowledge of it, sir.

12. How, in respect to value and salability, does the bolt produced by die work compare with the bolt formerly produced by hand forging?

213 A. It is much smoother, more uniform, and has taken the place altogether of hand work.

13. If the two bolts, the bolt produced by dies and the bolt produced by hand work cost the same, could the latter, in your opinion, be sold in the market at the same price?

A. No, sir.

14. Can you express in market value the difference between these two different kinds of manufactured bolts?

A. I should say that a king bolt made by dies and of one made by hand there would be no difficulty of selling the one made by dies at fifty cents a dozen more than those made by hand as they are ordinarily made by hand.

Cross-examined by Mr. FENTON:

X 15. When did you become a member of the firm of H. D. Smith and Co.?

214 A. I think it was in 1861 or 1862; I am not positive about that, but near that time.

X 16. Have you had any practical experience in the manufacture of clip king bolts either by dies or hand forging?

A. I have not made them myself, sir, by my own hand, except as I am a manufacturer of them and claim to know something about it.

X 17. How long have clip king bolts been an article of commerce in the United States as far as you know?

A. So far as I know about the year 1861; possibly I am a little too early; I am merely giving now something that I cannot give the exact date of.

X 18. Did your firm make any by the hand forging process, and when?

A. We did not.

X 19. When you stated that a skilled mechanic could make

215 from forty to fifty a day by that process what part of the manufacture did you take into consideration?

A. The manufacture of the parts called the clips. I said 45 to 50.

X 20. Did you include the opening, turning, bending and furnishing of the clip in that answer?

A. I did.

X 21. You did include all these several operations I have named, did you?

A. I did; yes, sir.

X 22. Did you ever see any clip king bolts made by hand forging?

A. Yes, sir.

X 23. Where?

A. It is so long ago since that I could not tell the place
216 where; I have seen them in many blacksmith shops; I have also seen those made by Josiah Wilcox.

X 24. How long since you saw any made by hand forging, about?

A. I could not answer, sir; a good while ago.

X 25. Please state as nearly as you can how long ago?

A. It might be twelve, it might be fifteen years ago; it was a good while ago; the reason of it is that there are no king bolts made by hand, so far as I know, used.

X 26. Have you ever witnessed the process of the manufacture of clip king bolts by hand forging?

A. I do not remember; it is so long since.

X 27. Have you witnessed the process of making clip king bolts by the Miller dies?

217 A. I have not witnessed the process of their manufacture by the Miller dies exactly as they have them, but by dies of a somewhat similar nature.

X 28. Where and when?

A. At my own manufactory; a great many times during the past twelve years.

X 29. What dies have you reference to that you say were similar in nature to the Miller dies?

A. Dies that were used by H. D. Smith and Co.

X 30. Are they the dies described in letters patent of the United States, granted to F. B. Morse October 26th, 1869, and Feb. 22nd, 1870?

A. I think they are; at least, they are dies patented by Mr. Morse.

X 31. Does your firm own these two patents?

A. They do, sir.

218 X 32. Has your firm successfully used the process described in each of those patents for the manufacture of clip king bolts?

A. They do, sir.

X 33. Prior to the use by your firm of the Morse dies referred to, what dies did your firm use in the manufacture of clip king bolts to form the head and clip arms?

A. We used dies similar to them some time before Mr. Morse patented them.

X 34. Did you not use other dies prior to these for that purpose?

A. The first clip king bolts we made were made in dies invented by Mr. Morse.

X 35. When did you first use them at your manufactory in the

manufacture of clip king bolts; I refer to either and both of the Morse dies described in the patents I have mentioned to you?

A. Some time previous to the dates of the patents, but I
219 could not answer more definitely than that.

X 36. Do you know Wm. S. Ward, of the firm of Strong and Ward, Newark, New Jersey?

A. I do, sir.

X Q. 37. Was he in the employ of your firm from the commencement of your use of any dies for forming, bending, and finishing the heads and clip arms of king bolts?

A. Mr. Ward was in our employ a number of years; I could not say whether he was there as early as that or not. I mean I could not here; perhaps I could at home.

X 38. In the use of dies for forming the head of the bolt from Exhibit B into Exhibit A, is there any intermediate die used between the die figure 5 & figure 6?

A. Yes, sir; there is a trimming die.

X 39. If the blank, Exhibit B, was formed in the forming die figure 5, and trimmed in the trimming die, so as to bring
220 it into the condition of the blank, figure 2, of the plaintiffs' patent, how much would it cost to bend up the clip arms as shown in Exhibit A, by the hand process instead of using the bending dies, figure 6?

A. I have some doubt whether it could be done practically by hand at all; because it needs to be rounded in the solid part of the bulk where the clip arms do not bend.

X 40. Please look at figure 6 in the plaintiffs' reissued patent, and state whether you understand the construction and operation of the die there described?

A. I think I do, sir.

X 41. Could you or not use that die without figure 5, and bring the blank Exhibit B into the condition of blank Exhibit A by repeated operations with die figure 6 alone?

A. It is possible that it might be done, but it is not probable that a blank like the one Exhibit B would form the clips in good
221 shape like Exhibit A, as it will be seen the arms don't stand in line so that they would strike the depressions in the die correctly.

X 42. Please answer this question again, considering that you use the blank shown in figure 1 of the patent instead of the blank Exhibit B.

A. If it were as accurate as the drawing is, it is possible that it might be done; but if it was it would be an infringement of our patents.

X 43. Then, it is your opinion, as a mechanic and as a manufacturer of clip king bolts, that it could be done; namely, that figure 5 of the patent could be dispensed with, and the figure 6 would alone both form and bend a blank like figure 1 into a blank like Exhibit A?

A. You could not make a king bolt of that form, Exhibit A, in that die, Exhibit 9.

X 44. Why not?

222 A. Because the die figure 9 is not of the shape of the king bolt Exhibit A.

X 45. Is it different in any other respect than in the angle of the clip arms?

A. Practically not.

X 46. Do you think there is any substantial difference between the two clip king bolts simply because the clip arms of each are at a slightly different angle?

A. Upon the question at issue I consider that there is a difference; I am asked whether figure 5 cannot be dispensed with, which is used to forge the clip before it is bent, and a die which is made with the arms nearly perpendicular will not, in my opinion, forge the clips as well as if they were made in a partially horizontal or V shape as are the Morse dies, where the forging of the clip and the bending of the same can be done with one die more easily than with figure 6.

223 X 47. Please look at the plaintiff's reissued patent and state whether or not, in your judgment, as a mechanic and manufacturer of clip king bolts, the die figure 6 could not be used alone and to the exclusion of Fig. five in bringing a blank such as is shown in figure 1 into a condition such as is shown in figure 3 of that patent?

A. It possibly might be done; but it is the property of H. D. Smith & Co.

X 48. Then you mean, do you, that in your judgment it could be done, but that it would infringe your patent that you refer to?

A. I think it could be done, but I do not think it would make as good a bolt as to forge it first and then put it into these dies and bend it.

X 49. How not as good?

A. For reasons given in my answer to interrogatory No. 46 heretofore given.

X 50. Is this the patent you refer to in your answer to X interrogatory 47 & 48?

224 (The witness is shown patent to F. B. Morse, No. 100,178, dated Feb. 22nd, 1870.)

A. That is one of them; we have several patents on our process; I can simply say that is one of them.

X 51. Which process, in your opinion, is the least expensive if there is any difference, namely, the use of both dies Nos. 5 & 6 of plaintiff's patent to bring figure 1 to the condition of figure 3, or the use of figure 6, alone, for that purpose?

A. Never having used a die like figure 6, exactly, I could not say how it would work, and therefore I could not answer the question.

X 52. What is your judgment in that matter as a mechanic and a manufacturer of clip king bolts?

A. My judgment is that until I had used No. 6, alone, to see what the result of its use alone would be, I should use No. 5.

X 53. You have stated in a previous answer, without quali-

225 fication, that in your judgment the die figure 6 alone would bring the blank figure 1 to the condition of the blank figure 3; now what I asked you is whether, in your judgment, it would cost more or less to use figure 6 alone for that purpose or to use both figures 5 & 6 for a like purpose?

A. I think my answer referred to would imply some doubts as to what the results of the use of die figure 6 alone would be. I am still uncertain as to what extra additional work might be needed to produce clips, as per figure No. 3, if only die figure 6 was used.

X 54. What additional work, if any, do you refer to, beyond the angle of the clip arms, or the peculiar curvature of the head of the bolt at the base of the clip arms?

A. I do not know what condition the clip arms would be in from that die.

X 55. Presuming that they were in the condition shown in Exhibit 3, and that no additional work was required to shape the clip arms, what difference, if any, in cost would there be 226 between using the pair of dies and between using figure 6 . . alone to make figure 1 into figure 3?

A. I don't think I had better answer that question unless I know it. I never made a king bolt that way. I think it would be a saving if it could be done that way, by the single die instead of the two.

X 56. Never having made nor seen made a clip king bolt by hand forging, as you have said, are you as equally certain of the production and cost of the clip king bolt by that process?

A. I think I understand better what the cost of king bolts made by hand is, owing to the simplicity of the process and what blacksmiths have told me, than I should about the results of this figure 6 alone performing the clips of the king bolt. I am led to doubt the use of figure 6 alone as being desirable in the process under question, from the fact that two large manufacturers have for several years used and thought it necessary to use both dies.

227 X 57. What two companies?

A. The Atwater Manufacturing Co. and J. B. Sargent.

X 58. (Morse patent of Feb. 22nd, 1870, shown witness.) State whether or not your firm has, for a long time, made a good and marketable clip king bolt equal to that made upon the Miller die by means of the single dies shown in that *that* patent?

A. They have, sir, in our opinion.

(Defendant's counsel offers in evidence copy of letters patent granted to F. B. Morse, No. 100,175, dated Feb. 22nd, 1870.)

X 59. Do you, as a mechanic and manufacturer of clip king bolts, deem it absolutely necessary to use more than a single die and plunger to shape the clip arms of a clip king bolt?

A. I should say not, because, in the Morse process, we do not do it; but I will make a distinction between that and the Miller dies in that respect. I know what the Morse die will do, but not what the Miller dies will do in that respect.

228 X 60. If you do not know what the Miller dies will do, how was it that you was able to tell us so exactly this morn-

ing the exact cost of bringing a Miller bolt blank into its final shape by the use of the Miller dies?

A. I have not stated; I did not know what the Miller dies would do; that answer related to one die alone.

X 61. Was not your answer this morning as to the cost of making a bolt blank on the Miller die based exclusively on your experience with the Morse dies, and not from any knowledge you had of the Miller dies?

A. More largely from my experience with the Morse dies, but not wholly.

X 62. From what other information or experience did you make out that estimate of cost?

A. From a knowledge of their dies, and what I have heard they contracted that part of the work out for.

229 X 63. Do you mean to say that you know of your own knowledge the cost of bending a blank on their dies?

A. I do not know it by any experimental use of their dies.

X 64. State briefly how you do know.

A. I know what it costs to do the same work on our dies, and I have heard Mr. Savage, who used the same dies, pays for the work, and to do that I added what I thought was a fair estimate for the wear and use of the dies.

X 65. About what are clip king bolts worth in the market?

A. They are sold at from $1.50 for No. 1 up to 4, for the largest sizes, per dozen; Nos. 1 & 2 are $1.50.

X 66. What proportions of the cost of the bolt is involved in the formation of the head and clip arms?

A. I have not the facts upon which to answer that question in that form.

230 Re-examined by Mr. INGERSOLL:

R. E. 67. You have referred to certain Morse patents owned by your company; have you ever licensed anybody to use the inventions of those patents or any of them?

A. We have not.

GEO. E. SMITH.

Subscribed and sworn to before me, this 23rd day of Sept., 1881.

E. E. MARVIN, *Master.*

R. R. MILLER, sworn:

I have already testified in this case, and am the patentee.

1. Before you invented the dies which are the subject of the patent in this suit, had you ever made king bolts, and if so, where, and in what way?

231 A. Yes, sir; I had made them at H. D. Smith & Co.'s in 1867, partly by hand, and partly by drops, and partly by trip hammer. I made the first king bolt ever was made in his shop.

2. When you say by hand, what do you mean?

A. The king bolt was put into a foot vice; a common blacksmith's chisel was held into this split and struck on with a hammer, and

then we took a blacksmith's fuller, the fuller was driven into the split to throw out the clips; then it was taken to a drop, and these clips were drawn out under the drop one at a time; after the clips were drawn out under the drop it went back to the trip hammer, and then the stem was water finished, which completed the bolt.

3. How long did you make clip king bolts at H. D. Smith & Co.'s in this way?

A. From two to three weeks, off and on.

4. How many bolts could you, with a helper, make in that manner?

232 A. I did not want any helper with a trip hammer and drop.

5. Did you ever make clip king bolts by hand forging in any other way than you have just described?

A. Yes, sir.

6. When, where, and how?

A. In 1849; in Paterson, New Jersey, in Woodnut street, with a helper; forged them on an anvil with regular blacksmith's tools—hammer, fuller, swedges, tongs, and chisel.

7. Looking now to that part of the work which is required to make such a blank as Exhibit B, into the bolt as shown by Exhibit A, without its flanges, in what time and at what cost during the last two years could a smith and his helper do that work in the manner in which you were accustomed to do it with the blacksmith's tools you have last spoken of?

(Objected to, because it already appears that the method spoken of is not the next best method of performing the operation open to the public, and because it is only the cost between 1879 and 1881 that is relevant here.)

233

(Overruled, and objection taken.)

A. That you could not do; but you could take a piece of iron and get out from 40 to 50 in a day entirely by hand work, with a helper, without the flange; I mean the portion inquired after. My wages as a smith was $4 per day, and a helper would cost $1.50. That was what the helper got there at Atwater's with me.

8. How long did it take you at H. D. Smith's to do the same work on clip king bolts by using the drop, and trip hammer, and vice, as you have testified?

A. If a man should get off 80 or 90 bolts in a day it would be a good day's work, one man working alone and finishing the whole bolt.

9. How many bolts could he put into the condition shown by Exhibit A without its flanges?

234 A. He could not make any his way like this; that is, the way he made them; because there was a stem to be drawn out and a collar; a rough collar had to be made first so as to hold it in the vice while the clips were made.

10. Supposing the collar to be made first, how many bolts could be finished by forming the heads and clips in a day by that process?

A. From 75 to 80. This is speaking of H. D. Smith's first way of making bolts.

11. How would the bolts made in that way compare in value with the bolts made afterwards by your dies?

A. They would not be worth one-half. They would not sell for one-half in the market.

12. Did you know of the manufacture of clip king bolts by Josiah Wilcox, of Portchester, before he commenced to manufacture by use of dies?

235 A. Yes, sir; he made them by hand first.

13. And with what tools?

A. He made them with sledge hammer, chisel, foot vice, fullers, swedges, hand hammer, and tongs, etc.

Cross-examined by Mr. FENTON:

X 14. How long has it been since you manufactured clip king bolts by hand, or saw any manufactured in that way?

A. In 1868, at J. B. Savage's shop, was the last that I saw manufactured in that way; that is, with trip hammer and drop. In 1867 is the last that I made any.

X 15. Did you know F. B. Morse?

A. Yes, sir.

X 16. Was he employed at H. D. Smith & Co. while you were there?

A. A little while in 1868, I think.

236 X 17. Do you recollect the improvement in dies for king bolts made by him?

A. I don't know what you mean by that. He made no dies for making king bolts while he worked at Smith's shops that I have ever seen.

X 18. Do you remember the improvement in dies for king bolts made by him, his application for a patent for which was placed in interference with your?

A. I remember this, that he never made any improvement on king bolt dies to my knowledge. He put in an interference after I had made application for my patent, and my patent had been allowed.

X 19. You remember that the interference was dissolved and a patent issued to him as well as to you on the same day, do you not?

A. I remember that, but think my lawyer was bought off. Mr. Atwater knows best about that.

237 X 20. Look at that patent, granted to Morse February 22nd, 1879, and state the difference in the die there shown and the die, figure 5, in your reissued patent, so far as respects the resultant product of each.

A. Mr. Morse must have a blank pretty much the same as I, only he has a little more work to get his blank out than I have; otherwise the dies are about the same, only his is V shaped and mine is flat.

X 21. Answer the same question, comparing Morse's die with figure 6 of your reissued patent.

A. Our figure 6 is merely a bending die. They both will produce the same bolt either flanged or plain; they are both on the same principle; they will both do the same work; I claim that both dies are alike in principle. His bolt after being finished, as far as appears here, has to go into another die not shown.

X 22. How many bolts do you produce by your dies 5 & 6 as they now work on a fair average?

238 A. I presume that a man will make 150 to 175 complete bolts, taking it from the rod.

X 23. Do you have a man to each die?

A. The man that takes the job puts it out and has a man to each part, each die; but a man could do alone 150 to 175 per day and do the whole work, all parts.

R. R. MILLER.

Sworn to and subscribed before me, this 23rd day of September, A. D. 1881.

E. E. MARVIN, *Master.*

Hearing adjourned to Mr. Ingersoll's office, New Haven, Oct 3rd, 1881, 10.30 a. m.

HARTFORD, *Oct.* 3, 1881.

Hearing adjourned by consent to Nov. 14, 1881, 10 a. m.

NEW HAVEN, *Nov. 14th*, 1881.

Hearing upon accounting.
Parties present as heretofore.

JULIUS B. SAVAGE, of Southington, sworn for complainant:

I am an iron manufacturer, making carriage hardware;
239 been so engaged fifteen or eighteen years; call it fourteen years; before that was engaged in carriage bolts and nuts for thirty years, probably, in all; have been making clip king bolts 10 or 12 years; am making them now with Miller dies. The work done upon the clip king bolt, which is done between the stages represented by Exhibit A and Exhibit B, is done by the piece, by the contract. It costs 95 cts. a hundred; that includes both styles, No. 1 and No. 2, flanged and plain. The contractor furnished nothing but labor. A fair estimate of the cost of the dies and the wear and tear of the dies is forty-five cents a hundred; ten cents a hundred would be a liberal estimate for the power. There was some clip king bolts made in the shop before I used the Miller dies, but I have forgotten about them. I have heard that there were some made in H. D. Smith's shop, but I never saw them made. I could not tell intelligently how they were made in my shop. The clip king bolts that were made and put on the market before the use of the Miller dies for marketability, use, etc., were rough and unsaleable, and
240 everybody quit using them after the bolts made by the Miller dies came into the market. (Objected to.) They probably was not worth more than half as much as those made by the Miller dies. (Objected to.)

1. Have you any knowledge as to the cost of forming the heads of clip king bolts before the Miller dies came into use?

A. I should think a man and his helper might do 75 or 80 in a day.

2. How much would you pay a man and his helper per day to do that work?

A. About $3 25 cts.

3. Do you contract for simply the forming and bending of the bolt or the entire operation of making the king bolt?

A. One party has the forming and bending, other parties do the rest of it.

4. How much do you pay per day to the man to work the clamping die?

241 A. I cannot tell what the clamping die is; there are two of the dies which work up in this shape, and I cannot tell which the clamping die is.

X 5. Do you use both of the dies shown in plaintiffs' patent in figures 5 & 6?

A. Yes, sir; I believe we do.

X 6. After the blank leaves figure 6, do you not put it through another pair of dies to finish the shape of the head?

A. No; not to make the head we don't.

X 7. Please state the subsequent operations of making a clip king bolt after the bolt leaves the dies, figure 6.

A. The stem is drawn out with a trip hammer, leaving a collar on the stem; it then goes into a clamping die that finishes up the head; we always call it the necking die; it is then put under a water finishing die and trip hammer; that finishes the whole length.

242 X 8. Is a hand-made bolt any rougher in appearance than the blank, Exhibit A?

A. Yes, sir.

X 9. Do the trip hammer dies alter the shape of the head of the bolt, or do they simply make the collar?

A. Well, they make the collar; I do not see that they alter the shape of it any.

X 10. Do you not use the clamping or necking dies for giving finer shape to the head of the bolt and rendering it smooth and finished before it is put into the water finishing die?

A. We do for finishing the head of the stem; it might possibly change the lower end of the head outside of the stem a little, and it might not

X 11. Suppose a hand-formed bolt blank was given final shape and finish and smoothness in the clamping or necking die,

243 would not the resultant bolt be as valuable and saleable as the machine-made bolt?

A. No, sir.

X 12. Why not?

A. Because the rest of the bolt would not be as good as the one forged by dies.

X 13. In what respect would it not be as good?

A. It would not be as smooth; it would not be as even.

X 14. Is that all?

A. Of course, it would not be as saleable.

X 15. Any other reason?

A. That is reasons enough.

X 16. If you can state any other reason, state it.

A. I don't care to state any other reasons.

244 X 17. Is smoothness given to the bolt by the Miller dies, and, if so, which one?

A. By pretty much all of them.

X 18. When the bolt blank is put into the clamping die it is put in hot, is it not?

A. Yes, sir.

X 19. And if the upper die or plunger is made to properly strike the blank in the anvil of the clamp dies, would it not remove any irregularity of shape and give a smoothness to the blank?

A. It would at the top of the stem; but the inside would not be any smoother than it was before.

X 19. What do you mean by the inside?

A. The inner surface of the clip arms.

X 20. Why would it not finish the inside as well as the outside?

245 A. Because it is already finished.

X 21. (Defendant's Exhibit 1 shown witness.) Does that drawing substantially represent the clamping die used by you?

A. I should say it did.

X 22. Then, if shape and finish had not been previously given to the bolt blank by die Fig. 6, such shape and finish would be given to the blank by the clamping die, if I understand your previous testimony correctly; is that so?

A. I suppose it would, if the die was made for the purpose of doing it; shaping it, upper side, as well as under.

X 23. How many dies altogether are used by you, in addition to the two Miller dies, in making a complete king bolt, finished as you would sell it in the market?

A. Well, there are four, I think—that is, the drawing die, the finishing die, the trimming die, and the die to make the blank.

246 X 24. By your last answer do you mean by other names to mention the collar die or trip hammer, the clamping die, the trimming die, and the water-finishing die? Have I named them correctly?

A. I did not mean the clamping die.

X 25. Then are there four other dies in addition to the clamping die and the two Miller dies as used by you?

A. Yes, sir; I guess so.

X 26. What proportion does the cost of making the blank Exhibit B into Exhibit A bear to the full cost of making a completed king bolt ready for the market as the manufacture is carried on at your place?

A. All the rest of the work done to this blank Exhibit B to make it a complete king bolt cost $1.14 per 100.

X 27. Does not the $1.14 include the making of Exhibit B?

A. Yes.

[X] 28. Does not the $1.14 include anything beyond labor?

A. No.

247 X 28. What is the average manufacturer's profit at this time in the manufacture of clip king bolts?

(Objected to.)

A. 50 per cent., probably.

X 29. What allowance would you make for power and cost and wear and tear of dies in the operation of clamping, trimming, opening Exhibit B, turning the collar, and water finishing?

A. Well, probably 50 per 100.

X 30. Did you ever make any king bolts by hand?

A. Not strictly by hand, that I know of.

X 31. Did you ever see anybody else make them by hand?

A. Some parts of it I have.

X 32. What parts?

A. I have seen them turning up the stem drawing out the arms.

248 X 33. When did you last see such operation?

A. I should think 14 or 15 years ago; I could not be positive about it.

X 34. Were clamping dies and water finishing dies used in the manufacture of the hand-made bolts referred to in your direct testimony as being rough and unsalcable in comparison with die-formed bolts of the present date?

A. No; not to my knowledge.

X 35. Do you know of anybody having made clip king bolts by hand in the last ten years?

A. No; not to make a business of it.

X 36. Have not clip king bolts substantially in the form and shape as made by you, both flanged and plain, been a well-known article of manufacture for the past 8 or 10 years?

A. I think they have.

249 X 37. Are you one of the p'lt'ffs in this case?

A. Yes, sir.

X 38. And you were instructed in the original patent to Miller at the date of its issue to him, were you not?

A. Yes, sir.

J. B. SAVAGE.

Subscribed and sworn to before me, this 14th day of November, 1881.

E. E. MARVIN, *Master.*

Adjourned to Dec. 1st, 1881, 11 a. m., at Gov. Ingersoll's office, New Haven.

NEW HAVEN, *Dec.* 1, 1881.

Adjourned to Dec. 12, 1881, 10 a. m.

250 NEW HAVEN, *Dec. 12th*, 1881.

Accounting continued; parties present as heretofore.

JULIUS B. SAVAGE recalled:

1. If you wish to correct your testimony as to the price you pay for work in making king bolts by the Miller dies, in any respect, you can now do so.

A. Well, I made them cost $2.09 before, it should have been $2.40.

2. In what part of the work was this item of 31c. that *that* you omitted?

A. 30 cents of it was for making the blanks, the one cent was for drawing the stem.

3. Then your previous testimony as to the cost of turning Exhibit B into Exhibit *A* which you put at 95c. needs no correction.

A. No, sir.

250½ Cross-examination by Mr. FENTON:

X 4. Who asked you to correct your testimony?

A. I rather asked it myself.

X 5. When did you ask it?

A. I spoke to Mr. Ingersoll this morning.

X 6. Did you read over your testimony this morning?

A. No, sir; I did not.

X 7. What do you mean by the item 30c. for making the blanks?

A. For making this Ex. B.

X 8. Would you not have to make Exhibit B, even though the rest of the bolt were made by hand?

A. Nearly so; yes.

X 9. Question repeated. Say yes or no if you mean it?

251 A. When they are not made by hand, they are upset in here, the crotch of the bolt, that is all the difference I see.

X 10. How many completed clip king bolts do you turn out in a day, using the dies shown in the reissue patent in this case?

A. From 300 to 325, working 7 or 10 hours a day.

X 11. How many forming dies and how many opening dies did you use in making that number per day?

A. Used all we had, I presume.

X 12. How many have you then?

A. They go on five different machines, some have two operations on them, some one.

X 13. How many forming dies like figure 5, and how many bending dies like Figure 6 of plaintiff's patent did you use at your place in making the 300 to 325 bolts per pay?

A. I don't see that we used but one apiece of them.

X 14. Do you mean to say that you did not use but one swedging or opening die in making 300 or 325 bolts per day?

252 I do say it.

X 15. How many men were engaged in all the different stages of making the clip king bolt at your place in turning out that 300 to 325 per day?

A. About 2½ men.

X 16. Did one man attend exclusively to the splitting of Exhibit B?

A. No, sir.

X 17. Did one man attend exclusively to the swedging or opening die?

A. Yes, sir.

X 18. Did one man attend exclusively to the operation of the bending die Figure 6?

A. No, sir.

X 19. What other duty did he perform?

A. He brought in iron, carried out coal, brought the water, did anything about the shop that was his business.

253 X 20. Do you mean to say that the bending die, Figure 6, would bend more bolts than could be formed in the same time on the opening die, Figure 5?

A. Yes, sir; I mean to say that.

X 21. Is the yield per day limited to the number of blanks that could be put through the opening die, Fig. 5?

A. Yes, sir.

DENNIS P. WEBSTER sworn:

1. Have you been engaged in the making of clip king bolts by the Miller dies under contract with either of the complainants; and, if so, for how long?

A. I think it is since 1868. I have workek for both Mr. Savage and the Atwater Manufacturing Co.

2. Have you done the work by the pieces; and, if so, what parts of the work?

254 A. I have had the contract. It is for making the whole and finishing the work—taking the material from the bar iron and putting the finished bolts into the packing room.

3. What has been paid under your contract for that part of the work which is comprised in the step from the stage represented by Exhibit B down to and including the stage shown by Ex. A?

A. It costs 55c. per hundred to get it to the shape Exhibit B, and 95c. to get it from the stage of Exhibit A. After the stage Exhibit A I calculate that it costs 90c. to finish the bolt—two processes, stem drawn out in the rough and water finishing.

4. Under which contract is it that these prices are paid; that is, under your Atwater contract or the Savage contract?

A. The Atwater contract.

5. Is there anything else done to the finished bolt under your contract beyond what you have stated?

255 A. Yes, sir; there is the clamping of it, rolling, and greasing of the bolt.

6. State the cost of these processes.

A. 20c. for the clamping and 10c. for the greasing and rolling, making $2.70 for the whole work per hundred.

7. Was there any discount made on your contract price with the

Atwater Company, which you have stated was $2.70 on the whole bolt; if so, what was it?

A. 5 per cent., which brought it to $2.57.

Cross-examined by Mr. FENTON:

I am present in the employ of the complainants. I take the bolt from shape Exhibit B and do the work to make it Exhibit A. I use striking die, trimming die, and bending die—three dies. By the striking die I mean figure 6. The number we strike depends on the luck; average from 325 to 350; some days we do more; calculate to bend on Exhibit 6 the same amount.

256 1. How much does it cost of the 95c. to strike Exhibit B on the opening die and trim in on the trimmers?

A. I paid 95c. It is practically nothing for bending or trimming. It is all done with one heating. We pick it up as it comes hot from the welding die and put it into the trimmers and the bending die while hot. It only takes the time needed for the machine to move.

2. How do your bending dies differ from figure 6 of plaintiffs' patent, now shown you?

A. They are nearly the same thing and do the same work.

3. Is the anvil die solid or in two pieces?

A. It is solid, stationary—keyed into the press, made into two pieces.

257 4. After that do you use the clamping die to finish the bolt such as is shown in Plaintiffs' Patent Figure No. 1?

A. Yes, sir.

5. How long have you been using bending dies in which the bottom die is in two pieces?

A. In 1869, at Savage's.

6. Are you familiar with the dies at H. D. Smith & Co.?

A. I am not.

Mr. WOODRUFF recalled:

I am the president and manager of the Atwater Company.

1. You have heard the testimony of Mr. Webster as to the cost to you of the manufacture of clip king bolts under your contract with him; state whether he is correct or not?

258 A. He is, sir.

2. For how long has the cost of labor in the manufacture of the bolt to you been substantially as stated by him?

A. It has not varied materially for 5 or 6 years.

3. How has the price of mechanical labor during this period compared with the price of such labor in 1867?

A. It is my impression that it has not changed a great deal in that time; there has been but a slight difference.

4. Were you acquainted with the kind of clip king bolts in the market before the use of the Miller dies in their manufacture?

A. I never was.

5. Did you see them in the market at that time?

A. I saw hand-made bolts, but I never saw then until 1869 or 1870.

259 6. How did they compare in quality with the die-made bolts?

A. I should call them a rough article at the present time.

7. Would such bolts have any place in the market by the side of the die-made bolts at the present time?

A. I think it would be hard to give them away.

8. At what price were the hand-made bolts sold before the die-made bolts were brought into the market?

A. It is my impression that they were getting $5 or $6 a dozen for them.

9. At what price have the die-made bolts been sold?

A. $1.50 and $1.75 a dozen; the plain bolt, I mean.

260 Cross-examined by Mr. FENTON:

X 10. Who made the hand-made bolts that you saw in 1869?

A. I had the impression that they—made at Port Chester.

X 11. Who by?

A. They said by Josiah Wilcox, at Port Chester, N. Y.

X 12. Do you know who made the hand-made bolts that you saw in 1869 or 1870?

A. I only know it from what a man said.

X 13. Who told you, and where did you see the bolts?

A. I saw them at Van Horn & Co.-, Chambers st., New York, and Mr. Van Horn told me that they were made by Josiah Wilcox at Port Chester. I have seen no hand-made bolts since then.

261 X 14. Are not clip king bolts an article of general manufacture at the present time?

A. Yes, sir.

X 15. And do not these bolts sell readily in the market as well as bolts made by your concern?

A. Do you mean die-made bolts?

X 16. I mean bolts that are the product of rival manufacturers of carriage hardware, and that have been and are now for sale in the market.

A. I don't know why they should not.

R.-X. 17. Do you know of any manufacturer who is making the clip king bolt by any other dies than the Miller dies or dies claimed to embody the Milier invention?

A. I do not.

R.-X. 18. Do you know how H. D. Smith & Co. make their clip king bolts?

A. I do not.

262 Re-X. 19. Do you know how the Beecher M'f'g Co. make their bolts except by what you have heard in this case?

A. No; except from a description of the men that worked there.

Re-X 20. Do you know how the E. D. Clapp M'f'g Co. of Auburn, N. Y. make their clip king bolts?

A. Not anything that I have seen.

Re-X 21. Do you know or don't you know?

A. I have never seen them make a bolt, sir.

Re-X 22. Do you know how the Walker & Williams Forging Company of Cincinnati, Ohio, make their clip king bolts?

A. No, sir.

R. B. MILLER sworn:

1. You have testified as to your making clip king bolts at H. D. Smith & Co.'s before the invention of your dies; were you paid for any of that work by the piece; and, if so, at what price?

263 A. I was, at $5 per hundred.

2. You have testified that your day's wages when at H. D. Smith & Co. was $4 per day; what were you paid when you last worked at Savage's by the day?

A. $4, I think. It was up to 2 years ago last July.

3. In making the clip king bolts at H. D. Smith's, what was their first operation?

A. Cutting the bar iron in two in about six feet lengths, then the shank was drawn out under a trip hammer, and then it was cut off under the trip hammer a suitable length for the blank that is for the clips, then it went to a press and was split; then it went to a foot vice; then took a common blacksmith's chisel, opened these clips out; took a hand blacksmith's fuller; after they were fullered, took them to a drop, and drew out their clips singly; then they

264 went back to the trip hammer; the stem was water finished, and that finished the bolt.

X 4. Did that first operation of drawing out the stem under the trip hammer differ in any respect from the like operation in the present manufacture?

A. It is just the same; the dies were just the same then as they are now.

X 5. Did the operation that followed the drawing out of the clip arms and finished the bolts differ in any respect from the like operation in the present manufacture?

A. No, sir; it did not differ. The finishing operation was just the same then as now.

X 6. What was that final finishing operation, and on what dies, and by what means was it performed?

A. It is what we call a water-finishing die. It is a box die.

265 The bottom die is keyed solid into the bed of the trip hammer. The top die is what we call a box die. The top die that works in the box works loose. It is the same die that we are using now, at all events.

X 7. And you use the clamping die?

A. No, sir.

X 8. Don't you use the clamping die, now, to finish the bolt after it comes from your bender?

A. We use the clamping die now after it comes from the drawing die.

X 9. Is not that after it comes from the bending die in the shape of Ex. A?

A. After the stem is drawn out.

X 10. Did not these bolts that you made at H. D. Smith & Co.'s sell readily in the market?

A. I think they did.

X 11. If Ex. A was not finished in a clamping die, would it be a saleable bolt?

266 A. Not now; not these times it wouldn't.

X 12. Not more than a hand-made one, I suppose?

A. Oh, yes; more than a hand-made one.

EDWIN D. INGRAHAMS sworn:

1. Where do you reside, and what is your occupation?

A. 93 Foote St., New Haven; occupation, carriage blacksmith—that has been my business about 18 years.

2. Have you ever made clip king bolts?

A. Yes, sir.

3. Before such bolts were made by dies, how did the carriage-maker use to provide himself with them?

A. Used to forge them out.

267 4. Did you do any of that work at that time?

A. Yes, sir.

5. What tools did you use, and how was the work done?

A. A man would want an anvil, a pair of fullers, a pair of swedges, a chisel, a helper, and a sledge hammer besides his own hammer. A vice would be very handy, but a man could make one without a vice.

6. How many bolts could a man and a helper, with the tools at his command, ordinarily make in that way in an hour?

A. A man could block two out in an hour in the rough, the same as you get them from the factory.

7. Have you recently tried to see how long it would take you and a helper to hand-forge one of these bolts; if so, what was the result?

268 A. Yes; I tried since half past twelve to-day. We blocked one out in 23 minutes. This bolt that we blocked out was not near so perfect as one you would get from the drop.

8. What wages do you and the helper get per hour?

A. I get 33 cents per hour, and am not positive what the helper gets. I think he gets about 23.

9. How does these wages compare with the wages paid to the same hands when you used to make the bolts that you have spoken of as made before the die-made bolts were in market?

A. The wages are about the same now as they were then. They might have been better where I was than here; I don't know about that; I have only been here a few years. I was then working for Curtis & Bowen, at Kingston, N. Y.

X 10. How long since you made a king bolt by hand in the regular course of business?

269 A. Not in ten years. I don't remember making one in that time. The firm was not engaged in making king bolts. I never made for them any clip king bolts except for the carriages that I ironed. Each man made his king bolt for the carriage he

was putting up for his own job. I suppose I never made over twenty-five clip king bolts altogether. Used no foot vice; used bench vices. Used no dies; nothing but swedges. I don't know but you could call them dies; they were a collar tool.

Re-Ex. 11. Before the die-made bolts were made, was it or not customary for the smith who ironed a wagon to make his own bolts?

(Objected to.)

A. We always made them in the shop where I was working.

Re-Ex. 12. Why have not you made any in the last ten years?

A. Because it is cheaper to buy them than it is to make them. That seems to be the impression among the bosses.

(Complainants rest.)

270 *Defendant's Evidence.*

GEORGE E. WILCOX sworn:

I am and was, prior to 1870, engaged with Josiah Wilcox, in the manufacture of clip ring bolts at Port Chester, N. Y.

1. Will you please to state how many bolts per day were made at your shop by the means of the dies produced by you in this cause marked Exhibits 7 & 8?

A. Well, I could not tell exactly; from ten to twelve dozen per day.

2. Were the dies operated by steam power or by hand?

A. They were operated by hand power. I would correct that by saying it was by foot power, called a foot vise.

3. Did or not the die Exhibit 7, or the die Exhibit 8, perform both the operations performed by Exhibits 5 & 6 of the plaintiffs' patent, namely, of opening and of bending the blank?

271 A. They did.

4. I understand by your question, opening it as shown in Ex. B, and bending it as shown in Ex. A, and I answer yes.

5. If you substitute either the die, Ex. 7, or the die, Ex. 8, for and instead of both these dies, 5 & 6, of the complainants' patent, to perform the operations of opening and of bending the blank, would there be any difference in the number of bolts so opened and bent in a given time, presuming that you used steam power in both cases?

A. Well, if we should take the same dies that we used to use by hand and put them into a drop, I think we can knock off as many as we do now with a drop, and with less expense at that.

6. Question repeated, and compare your old dies, 7 & 8, with 5 & 6 of the pl'ffs' patent.

A. Yes, sir; I think we could do about as many.

272 7. How would the quality and market value of the bolt compare in the one case with that of the other, presuming that you used all the subsequent finishing operations as are now used by others in each case?

A. I could not tell till I tried it, but I should think that there could not be much difference.

Cross-examined by Gov. INGERSOLL:

X 8. You are the George E. Wilcox who has testified in this case, are you not?

A. Yes, sir.

X 9. Are the things that you call dies, which you say were used by you before 1870, the same things that you describe as so used by you in your previous testimony?

A. Yes, sir.

X 10. When did you discontinue the use of those things in the manufacture of bolts?

A. We discontinued them, I should think, about 1870, about ten years ago.

273 X 11. What did you substitute for them?

A. Well, we substituted a die that was in one piece, instead of two pieces, and which went into a drop.

X 12. And have you continued to use these last-described dies and drop to the present time?

A. We have.

X 13. Are you the G. E. Wilcox who wrote the letter in this case marked Compl'ts' Ex. D, and which I will now read to you?

(Ex. D read.)

A. I am the man who wrote it.

X 14. Were the dies that you referred to in this letter the dies that you have just testified that you have been using since 1870?

(Objected to, because the question is not cross-examination, and because irrelevant.)

274 A. Yes, sir. I will further state that I saw Mr. Savage about it, and he told us to use them as we had done. Before that we had stopped for nearly a year, as we had a large stock on hand.

X 15. When you changed to these last-mentioned dies, about 1870, did you have any communication respecting such change with Mr. Miller, the patentee of the patent in suit?

A. In 1870 we did not; did not know as there was any such man as Miller or any such patent; never heard of it till about a year ago or two.

X 16. Did you at any time in any year send for Mr. Miller respecting those dies, and for what purpose?

A. We never sent for Mr. Miller no years respecting these dies, that I ever heard of. I would say, in correction, that he worked for us some four or five years ago, and got up a necking die, which was the only thing that we sent to him about.

X 17. Who made your king bolts before 1870?

275 A. We had three different parties make them, John Green, Franklin N. Wilcox, Alexander Ganung, all of Portchester. They made them by contract. All our bolts before 1870 were made by contract.

X 18. Did Leander Burns make king bolts for you at any time by contract?

A. He took a contract in 1870, after we commenced to drop them, but let it out to another person.

X 19. Since 1870, what has been your production by the year?

(Objected to & ruled out.)

X 20. After you commenced your present manufacture by dies, drop, and steam power, what has been your daily production of bolts when working full time?

A. I cannot tell anything about it since 1878. We have not made over a quarter or over a half at the most, that we did before that time; perhaps five dozen a day since 1878.

X 21. Why did you make the change in 1870 to your present mode of manufacture?

A. We thought we might make them cheaper and better.

276 X 22. You did, didn't you?

A. We made them ¼ of a cent cheaper apiece or a dozen, I cannot tell which. It was when Burns had the contract, and I cannot tell for the life of me what it was I paid; Burns' father gave the contract at the time, and I had nothing whatever to do with it.

Adjourned to Dec. 13, 1881, 10 a. m., at O. H. & J. H. Platt's office, Meriden.

MERIDEN, CT., *Dec. 13th*, 1881.

Accounting continued. Compl'ts present by Messrs. Ingersoll and Prindle, and defendants by Mr. Fenton.

Evidence of the Defendants.

SILAS W. KENT sworn.

1. My name is Silas W. Kent; I reside in Meriden; age, 31; occupation, book-keeper of the defendants. I have seen clip king bolts manufactured at the works of the defendants for the last six
277 or eight years; am familiar with it, and understand it thoroughly, I believe. I have recently tested at the works of the defendant the capability of the defendant's clamp dies, Ex. No. 1, to perform the operations of forming and bending the blank in addition to clamping it. In using the clamp dies for that purpose and in that manner, I form the collar of the blank before the blank is bent.

1. Is or is not the clamp die as so used, inserted in the vise and the Fuller or upper die used or operated by power?

A. They are so inserted and so operated

2. Have you seen the clamp die Ex. 1 so operated in the manufacture of the bolt?

A. I have.

3. Will you please produce a sample of the blank which was operated on by the clamp dies No. 1 in the manner stated, and state briefly how the bolt is made; producing samples of the bolt in each of its stages, together with a finished bolt.

278 A. A piece of round iron is taken large enough to round the blank with the collar on, same as the sample, and the

collar is formed upon it the same way as we have always done by our collar-forming dies. (Sample marked 1 A.) Then the part which is to form the clips is split, as in this sample. (Sample marked 1 B.) And at the same heat the prongs that form the clips are opened out to an angle of perhaps 30 degrees, after which it is placed in the clamping dies, previously being heated. (The def't's Exhibit No. 1.) The vice brings the two parts of the die together, enclosing the bolt, after which the upper die or fuller is brought to strike between said prongs one or more times, when this exhibit is produced. (Sample Ex. 1 C.) This blank is then trimmed and rounded in a pair of hammer dies, producing a finished bolt, of which this is a sample. (Sample marked Ex. 1 D.)

4. In that operation of making the king bolt do you use any opening or forming or bending dies such as shown in the
279 Miller's reissued patent or any such as were formerly used by your company or anything substantially similar to them or any substitute for them, excepting alone the clamping dies referred to by you?

A. We do not except the clamping dies & the splitting & rounding dies such as we have always used. We use no substitute for the dies shown in Miller's reissued patent, except the clamping dies, which do all of that work in one operation.

5. Please explain what you refer to as the splitting and rounding dies?

A. The splitting dies are two cutters placed one in the anvil and the other in the hammer of the drop to split the iron, as shown in Exhibit one B. The rounding dies are used to form the stem and collar, as shown in Ex. 1 A, and another pair to finish the collar and make it smooth, as shown in the finished bolt, Ex. 1 D.

6. Then, if I understand you correctly, in making this
280 bolt Ex. 1 D by the operation we have described, you have dispensed entirely with the dies formerly used by you for the operations of forming or swedging, and the bending and substituted for them the clamp dies, Ex. No. 1, forming the collar first, instead of afterwards; is that so?

A. We have.

7. Does that operation of making clip king bolts enable you to make more or less bolts in a given time than if you used your old dies for forming and bending or the Miller dies for that purpose?

A. It enables us to make more.

8. Does the cost differ; and, if so, in which case is it the greater, taking everything into consideration?

A. The cost of making them substituting the clamping dies for the Miller dies will be about ⅓ less.

9. How does the quality and market value of the bolt made
281 by that operation by the clamp dies alone and as shown in Ex. 1 B compare with a bolt made upon the Miller die or separate dies for forming and bending?

A. Both the quality and market value are increased by dispensing with Miller forming die.

Cross-examined by Mr. PRINDLE:

X 10. Are you a practical blacksmith?

A. I am not.

X 11. In what manner have you then become thoroughly familiar with the manufacture of clip king bolts?

A. I have taken the time of the men who worked upon them and witnessed it.

X 12. In what respect is the operation of the bending dies, Def't's Ex. No. 1, when used as you have testified, different from the operation of the Miller forming dies?

282 A. In the first place the clamp dies, Defendant Ex. 1, is in two parts, and clamps the bolt after the collar has been made upon it. It finishes that part of the bolt at one operation, whereas the Miller forming die would require one, if not two, subsequent operations.

X 13. In what respect is the bolt as represented by the Def't's Ex. 1 C, I mean the clip portion, different from what it would be if produced upon the Miller forming dies aside from the different angle at which the arms stand?

A. No difference in shape, except the angle; but my experience has been that the iron is not as likely to break when struck in that form.

X 14. Is the iron more liable to break when struck by the Miller dies than when struck by your dies?

283 A. If you use the Miller dies as shown in the drawing a large portion of the bolts will break at the junction of the clip and stem, where it is drawn into the hole when being bent. We tried using a flat die first. So many of them broke that we put a groove, as shown in Def't's Ex. 13 (in def't's record), which largely remedied the trouble of breaking, but not entirely so. That groove was a groove at right angles to the impression which forms the clip.

X 15. In what respect are the bolts produced by the def't's dies, Ex. No. 1, different from the perfect bolt produced by the Miller dies?

A. No difference in appearance, but in the use of dies No. 1 the tendency to their breaking at that point is obviated.

X 16. In what way?

A. By the stock being struck without turning the grain of the iron out of the direction in which it was originally. In the Miller dies the stock is first struck at a right angle and afterwards bent out nearly straight, while in die No. 1 it is left nearly straight all the time.

284 X 17. How do you reconcile your last statement with the fact that the product of defendant's dies, Exhibit No. 1, shows the clip arms standing at right angles?

A. Nearly straight with the stock in the stem. The same stock don't run through both clips.

X 18. What is the difference in the relative angles of the clip arms and stem in Defendant's Ex. 1 C, and what would be true if said ex. had been produced in the Miller forming dies?

A. In the product of die No. 1, which is Def't's Ex. 1 C, the clips come out at an angle of forty-five degrees with the stem, while in the Miller patent they come out at a right angle to the line of the stem, and afterwards have to be bent back to form a marketable bolt.

X 19. Do you, then, consider that, having an angle of forty-five degrees with the stem, the grain of the iron in the stem and clip arm is nearly straight?

285 A. I speak of it as nearly straight, compared with being forced around a practically sharp corner, as seen in the Miller die.

X 20. You have testified that the product of def't's dies, Ex. No. 1, is better than the product of the Miller dies, or the dies that have heretofore been used by the def'ts. In what respect is it better?

A. Not in shape, but in the fact that the iron has not been bent and forced to a sharp corner and then bent back again, and though the weakening does not show in all bolts made by the Miller die, it shows it in some, and must exist to a greater or less extent in all.

X 21. How have you ascertained that such improvement exists in the bolts now made?

A. Since the opening the present case we heard that Josiah Wilcox formerly made them in that way by hand, and we thought we would try the experiment in a drop, and it turned out very

286 successfully. We have ascertained that such improvement exists in the bolts now made by bending them and by my former experiments with bolts made on the Miller dies. Also by bolts made in a similar management of the stock in a bending machine used by defendant.

X 22. How many bolts have you thus tested—I mean by the dies that you are at present using?

A. I have bent none of the bolts made on the dies that we are just using, but I bent many—I would not wish to state how many—in which the stock is bent in a similar manner, in which the dies are exactly the shape of the present dies, but are brought together, being fastened in hinges instead of being fastened in a vice.

X 23. Then, if I understand you correctly, you have no actual knowledge as to any improvement in the quality of the bolts made by def't's dies, Ex. No. 1, but base your statement on supposition?

A. I base my statement on knowledge of how bolts work

287 made in exactly the same way, so far as the bolt and its immediate dies are concerned, and also of my knowledge of the way in which iron works in forcing.

X 24. Do you refer to clip king bolts in your last answer?

A. I refer to clip king bolts in the first part of it, but to other articles as well in the latter part of it.

X 25. What clip king bolts, and by whom made?

A. Clip king bolts made by the defendants in about the year 1874; it may have been in 1875, in which the iron was put into the shape of Ex. 1 B, and struck in a bending machine where the dies worked exactly in the same shape as the dies in Ex. No. 1, but were held together differently.

X 26. Have you put any of the bolts as now made by the def't's upon the market?

A. We have not.

288 WILLIAM B. MCELNEY, sworn:

I reside in Meriden; my age is thirty-five years, and my occupation is that of machinist. I am familiar with the manufacture of clip king bolts, and have been so for eight or nine years, and I thoroughly understand the manufacture. I have examined and understand the operation of the dies shown in figures five and six of plaintiffs' reissued patent, and am familiar with and understand the dies and mode of manufacture of bolts used by the defendants prior to June last. I have heard the testimony of Silas W. Kent this morning, and I have seen and operated and understand the dies and mode of manufacture of bolts by means of the clamp dies Ex. No. 1, at the defendants' works as narrated by him.

1. Does or does not the clamping dies, Ex. No. 1, as now operated by you at the defendants' works, perform both the operations of forming and bending performed by the Miller dies, Figs. 5 & 6 of plaintiffs' patent?

A. It does.

289 2. In the manufacture of clip king bolts by the defendants at the present time by means of the clamp dies, Ex. No. 1, do you not make use of Ex. No. 13 or of any dies for forming or bending the blanks, or any substitution therefor other than the clamp die, Ex. No. 1?

A. We do not; that is for forming the clips of the bolt.

3. Please look at the Defendants' Ex. No. 1 C, and state if it represents a bolt blank as made upon the clamp dies, Ex. No. 1, as now used by defendant.

A. It does, and I made it.

4. Please look at the finished bolt, Ex. 1 D, and state if it represents a bolt the blank of which had been made upon the clamps dies, No. 1, as now used by the def'ts.

A. It does.

5. In the manufacture of clip king bolts as made by the defendant prior to June, 1881, was the collar formed before or after the blank was formed and bent?

290 A. The collar was formed after the blank was formed and bent.

6. In the manufacture of clip king bolts upon clamp dies No. 1, as now used by the defendants, is the collar formed before or after the blank is bent?

A. Before.

7. Look at the Def'ts Ex. No. 1 A, and state if it represents such a blank with a collar formed thereon?

A. It does.

8. Please look at Def'ts Ex. No. 1 B and state if it represents such a blank ready to be opened and bent in the clamping dies as now used by the defendants at their works?

A. It does.

9. In changing from the mode used by the defendants immediately prior to June, 1881, to the mode now adopted, did you make
291 any change in the splitting, rounding, collar forming, and water finishing dies.

A. We did not.

10. Will you please state briefly the mode of making the bolt, Ex. No. 1 D, by the defendants, as now performed by them by means of the clamp dies No. 1. I mean to request you to state the different stages illustrated by the several exhibits now shown you.

A. In the first place we take a piece of round iron and form a collar with a pair of hammered dies, and it produced Ex. 1 A. It is then split with a pair of splitting dies which produces a blank Ex. 1 B, it is then taken and put into the clamping dies and forms a blank similar to Ex. No. 1 C.

11. Then, if I understand your testimony correctly, the clamping dies as now used by the defendant in the formation of this bolt No. 1 C, for the forming and bending, are a full and perfect sub-
292 stitue for the forming and bending dies of the reissued of the plaintiff's?

A. It is.

12. And do they perform that work equally as well?

A. They do, and better, I think.

13. What difference, if any, is there in the cost of making a clip king bolt, between the two modes; that is to say, between the forming and bending as you now do it on clamp die, Ex. No. 1, or on dies 5 & 6, plff's patent?

A. I should think we could do it a third less by the clamping dies, Ex. No. 1.

14. How would the number of bolts turned out in a given time compare with the product turned out in the other case?

A. I think we could make a third more bolts by the use of the clamp die, Ex. No. 1, than by the use of the others.

15. How does the value and quality of the Ex. No. 1 B & C,
293 made by the defendants, on the clamp die, Ex. No. 1, as now used by them, compare with the quality and value of clip king bolts made on the Miller dies or the dies formerly used by the defendants?

A. I think they are better than those made by the Miller dies, because in those made on the Miller dies there is a sharp edge which is at right angles with the stem where the clip is bent; and when the clip is bent back in proper shape for market there very frequently is a crack where this bend is made, but in the Miller dies the bend is made once for all.

16. By the defendants' present mode of operation, is the clamp dies inserted in a drop press and worked by steam?

A. It is.

17. Did you see the Wilcox dies Ex. 7 and 8 which were offered in this case in evidence?

A. I did not.

294 18. Will you with the permission of the defendant show to the master and plaintiff's counsel the operations of forming

and bending Ex. No. 1 B into Ex. No. 1 C, by means of the clamp dies Ex. No. 1 in the same manner that they are now used in the formation of the bolt Ex. No. 1 D?

A. I will.

(At this point of the evidence the master, accompanied by counsel of the parties and the witnesses, visited the def's shop and witnessed the operation of striking the blank from the form Ex. 1 B to that of Ex. 1 C in one operation upon the dies Deft's Ex. No. 1, in a dozen or more instances, and having returned, the witness was cross examined by Mr. Prindle.)

X 19. How is the work upon clip king bolts done for the Beecher Manufacturing Company by the piece or the day work?

A. It has been done by the piece some parts of it, and some has not; as it is done now, it is done by the day.

X 20. How many bolts have there been made under the
295 new *new* arrangement, or rather with the new dies?

A. What you saw there with the exception of a few more around the shop we have just started up, probably not a hundred in all.

X 21. How many men are engaged in the manufacture of these clip king bolts at one time?

A. Never more than two. The rounding part, the making the collar, and drawing the stem is done by one man; when I get a sufficient number drawn, I then have them split by another man, then they are put into the clamping dies and forged there?

X 22. How many bolts can two men make in a day with the present dies?

A. I think after the bolts are rounded, that two men could strike five hundred.

X 23. Do you know how many can be made by two men in a day?

296 A. I do not. Not for certain. I know how many they could strike in an hour.

X 24. What proportion of the work upon the clip king bolt is due to the formation of the die?

A. The way that we strike them now I think it is about one-third of the work.

X 25. In making the king bolts by the dies used previous to June, how was the work given out; that is, did one party have the contract for doing the entire work?

A. I think not. I don't know certain, as I give no contracts out myself.

X 26. What proportion of the work under the old system was properly chargeable to the clip?

A. I should think there was a little over half.

X 27. Upon what do you base such estimate?

297 A. Simply upon the observation that I have of the work there.

X 28. How many clips could one man finish in a day under the old system?

A. I don't know as I could tell, as I never had one man working on them separately; that is, doing the separate parts of them.

X 29. How many men were at one time working on the clip, and how many clips could they finish per day under the old process?

A. We had three men to work at one time, as to how many they could fintsh in a day I could not say.

X 30. How many times is a blank for a bolt heated in being made into a finished bolt under the present process used by you in making clip king bolts?

A. Four times. At the first heat Ex. 1 A is made; at the second heat Ex. 1 B is made; at the third heat Ex. 1 C is made; at the fourth heat Ex. 1 D is made.

298 X 31. Under the old process how many heats were necessary?

A. Five. The first process was fitting round iron; next process was the striking of the blank into the form Fig. 5; the next heat drawing stem and collar; the next heat they were put into the clamping dies and forming them; the last heat they were water finished.

X 32. You have testified that the Miller dies rendered the clip liable to crack at the bend because of a sharp edge. Will you please point this out in defendant's Ex. 13?

A. At the intersection of the vertical opening and the horizontal groove.

X 33. Did the forming dies formerly used by the defendants have a sharp edge at the point you have specified?

A. They had an A edge there; I won't say it was very sharp, but it was an edge or corner.

299 X 34. Explain what you mean by an edge or sharp edge as you stated in answer to Int. 15.

A. It forms a corner or edge, the same as an angle of ninety degrees would.

X 35. Did the blank after having such die have a fillet at the intersection of each arm with the stem, or was there a right-angled corner?

A. There was a corner; it could not be a right-angled corner; that is, it could not be at right angles with the stem. The corner came right where the two grooves meet; I should say the corner was about a half an inch from the intersection of the arm with the stem, and from that point the arm went out straight.

R. D. 36. Do you recognize the bolt handed you as one made by J. B. Savage?

A. I do, sir.

300 R. D. 37. Do you recognize this other one as one of the bolts made on the clamp die?

A. I do.

(Def't's counsel put in evidence the two exhibits last shown the witness to illustrate the breaking of the fibre by the rebending of the two dies at the base of the clip arms; the first mentioned is marked Exhibit 1 E and the second is marked Exhibit 1 F.)

Re-X 38. How do you know that Ex. 1 E was made by Capt. Savage?

A. Because it is similar to the bolts he makes.

WARREN WILCOX sworn:

My name is Warren Wilcox. My age is forty-five years. I am a manufacturer of carriage hardware. Have been familiar with that business about fifteen years. I understand and am familiar
301 with the manufacture of clip king bolts. Have visited the works of the E. D. Clapp M'f'g Co., at Auburn, N. Y., and I know how they make clip king bolts there. They have been pursuing the same method of making clip king bolts for two or three years so far as I know, but I don't know positively. They forge the bolts by means of dies.

1. Can you produce a sample of the Clapp Co.'s finished bolts, and also a sample of the blank as it comes from the forging dies?

A. Yes, sir; I do.

(Mr. Fenton offers in evidence the bolt and blank, which are marked Ex. 1 G.)

2. Will you please state how the plain rod of iron is brought into the shape of a finished bolt by the Clapp process?

A. It is made from a stock 1¼ inches wide and three-quarter inches thich. There is a break-down die. It is put under the bread-down die edgewise of the clip and of the stock that spreads the clips and gets it nearly into the shape of the blank in Ex. 1 G; then
302 the stock goes right into a die that finishes in the shape of Ex. G; both upper and lower die are counterparts of this blank. The break-down die and the other die that I speak of are really one die. The next operations are the trimming, the clamping, and drawing out the stem. I understand the manufacture of the clip king bolts by means of the Miller dies. I have seen it a great many times.

3. What difference, if any, is there in the cost of making a clip king bolt by the Miller dies as compared with the Clapp process, in your opinion?

A. There is one-half difference in favor of Clapp's method.

4. Which process do you think would produce the most in a day?

A. Clapp's.

5. How many can be struck out by it in a day?

303 A. 700 to 800, as that is the blank of Ex. 1. G.

6. Is there any difference in quality and market value, in your opinion, between the bolts made by the Clapp process and these made by the Miller dies?

A. There is not, in my opinion; one is as good as the other.

7. You are not connected or interested in the Wilcox's, of Port Chester, in any way, are you?

A. I am not.

8. Is this Clapp process patented, so far as you know?

A. I do not know.

(Complainants object to the testimony of this witness, as wholly unconnected with the issue, and immaterial.)

(Defendants claim that same is material, and state that they propose to show that the Clapp process is open to the public.)

(Defendants close the case, reserving the right to prove the Clapp process is open to the public.)

Adjourned to first Thursday in Jan., 1882, Gov. Ingersoll's office, at 11 a. m.

304 NEW HAVEN, *Jan. 5th*, 1882.

Accounting continued.

Parties present as heretofore.

Mr. Fenton announces that defendant's evidence is closed.

GEORGE F. SMITH recalled by the complainants:

1. Have you read the testimony taken up in Meriden as to the method in which the Beecher Company have recently made clip king bolts by means of the single die?

A. I have.

2. State whether or not that method has been open to the public, and whether you or those interested with you have a patent for the die used or claimed to be used in that method.

(Question objected to; that the patent, if there is one, is the best evidence.)

(Compl'ts state that the patent will also be presented. Question allowed.)

A. It is not open to the public, and we have a patent covering the V-shaped die said to be used in that method.

305 3. Please produce a copy of it, if you have [one].

(Copy introduced and marked Smith Exhibit.)

4. Do you also own a patent of which the paper shown to you is a copy?

A. H. D. Smith & Co. own both the patents.

(Paper shown witness, placed in evidence, and marked Smith Ex. No. 2.)

5. Is the process described in the testimony referred to the same as that employed by you in the manufacture of bolts under those patents?

A. Yes, sir.

Cross-examined by MR. FENTON:

X 6. In the manufacture of king bolts do you follow exactly the process described in either of these patents, and which?

A. We follow the process covered by each of those patents; we do some things differently than is described in those patents;

306 for instance, we open the die in the center exactly as described by the defendants.

X 7. What do you mean by your last answer?

A. I mean that within a few weeks after the issue of the patent of Feb. 22, 1870, we opened the dies in the center, and were about to make a claim upon it, but, after consultation with competent experts, were informed that it was fully covered by the patent as already issued, which is the reason that we have never made any further claims.

X 8. By opening the dies in the center you mean making the lower die in two parts; is that it?

A. Yes, sir; it is all the difference between the process now used by us and that shown in the patent of Feb. 22, 1870.

X 9. When you testified that the process described in the Meriden testimony was covered by your patent, which patent did you mean, that of October 26, 1869, or that of Feb. 22, 1870?

307 A. Either one of them; more particularly that of Feb. 22, 1870.

X 10. How long have you been making clip king bolts at your establishment; since when?

A. I do not remember exactly, but I think it was some time in 1868; our first patent was taken out in 1869; I prefer to state it in 1869.

X 11. Do you know what a clamping die is?

A. I think I do.

X 12. Does that represent it? (Witness is shown Def'ts' Ex. No. 1.)

A. That represents a clamping die, if it is moved back and forth by a cam movement.

X 13. Do you mean to say by your testimony that a clamping die for clip king bolts is alone and of itself covered by your patents or anybody else's?

A. Not as a clamping die, but a clamping die may be covered when it is brought together and forms a solid die, such as is
308 claimed in the patent. (I mean the H. D. Smith & Co. patent of Feb. 22d, 1870.)

X 14. Do you mean to swear that the clamping die, Def't's Ex. No. 1, is described or claimed in your patent of Feb. 22d, 1870?

A. When the clamping dies are brought together for use, they are exactly the die claimed in our patent of Feb. 22d, 1870.

X 15. Don't you know that the clamping die has been in use for many years prior to the date of either one of those patents of yours?

A. I do not know that the clamping die had been in use prior to our patent of the V form for the purpose claimed.

X 16. If I understand you correctly, your opinion then is that the clamping die, Def't's Ex. No. 1, is not within the terms of your patent of Feb. 22d, 1870, when used as a clamp, but is only within its terms when used as a bender?

A. I would like to know what the gentleman means by his distinction between a clamp and a bender.

309 X 17. Have you any practical experience in the manufacture of bolts; and, if so, is it not the custom at your estab-

lishment to finish the bolt in the clamping die after you have previously bent it in the bending die?

A. I believe our firm, of which I am a member, is the oldest manufacture of king bolts in America by dies. It is not our custom to do so; we forge and bend the bolt at the same time at one heat.

X 18. Do you form the collar before bending or afterwards?

A. We have made them both ways.

X 19. Look at your patent of Feb. 22d, 1870, and say whether the collar is formed before or after the bolt is bent in the dies shown in this patent?

A. At the same time.

310 X 20. Will you please point out what part of the die Ex. No. 1 forms the collar?

A. In the central hole, die C.

X 21. Do you mean to say on your oath that you understand the use of the die shown in your patent of Feb. 22d, 1870, and that you understandingly make the statement that the central hole in the die, Fig. 1, performs the operation of making the collar on the bolt?

A. Not wholly; it is rounded, and the collar is entirely plain in this patent; as soon as we made the collar of a concave form we opened the dies in the centre.

X 22. And does the patent of Oct. 26, 1869, show at Fig. 9 the die opened in the centre as you used it?

A. Practically as we used it, though not exactly as we have used it since that.

X 23. Can you make a bolt such as you now make with the present form of collar by means of your dies shown in your pat-

311 ent of Feb. 22d, 1870; if you first form the collar upon the blank?

A. We can make one kind that way; another we cannot.

X 24. Please answer the question in reference to a bolt, such as is shown in Fig. 13 of your patent of Oct. 26, 1869?

A. I could not without opening the die.

X 25. Please state the several processes used at your establishment in the manufacture of clip king bolts by you under these patents briefly?

A. We split the blank, round down the bolt, place it in the V die shown in the patent, Feb. 22nd, 1870, and if the form of the collar is to be of the form shown in Fig. 13 of the patent of Oct. 26th, 1869, into the same dies opened in the middle; it is then struck by the upper V die, which forges the clips and neck of the bolt, and then put it into the trimming dies and turn it, after which the bolt part is water finished, which completes the bolt ready for the market.

312 X 26. Is not the collar formed by a process intermediate between the die, Fig. 1, patent of Feb. 22nd, 1870, and the clamping die?

A. Partly.

X 27. What part and by what means?

A. It is simply rounded and swedged by means of a pair of trip-hammer dies.

X 28. Then it is a fact that in forming such a bolt you make use of the solid dies shown in the patent of Feb. 22nd, 1870, and also the clamping dies shown, Defendant's Ex. No. 1?

A. When we use the clamping dies we do not use the die in one piece.

X 29. The question is repeated.

A. I am willing to place the word no before the answer above given.

X 30. Did you ever at your establishment make a clip
313 king bolt with a collar such as is shown in Fig. 13 of the patent of 1869, by means of the dies shown in the patent of 1870, without subsequently using the dies to form the collar, and afterwards a pair of dies either like those shown in the Defendant's Ex. 1, or like those shown in Fig. 9 of patent of 1869?

A. No, sir.

GEO. F. SMITH.

Subscribed and sworn this Jan. 5, 1882, before me.

E. E. MARVIN, *Master.*

JOHN E. EARLE sworn, and testified as follows:

I have been sworn before in the principal case; I am familiar with the patents issued to F. B. Morse, dated Feb. 22nd, 1870, and Oct. 26, 1869, respectively; I prepared and prosecuted the applications on which both of those patents were issued.

1. It has been testified that a die represented by Defendant's Ex. No. 1 has been used to form a clip king bolt at one operation;
314 state whether or not such a die so used is found and described in either of the patents referred to and therein claimed by the patentees.

A. Such a die is found in the patent of Feb. 22, 1870, and is therein claimed, and is the subject of the first claim. It is true Ex. No. 1 is divided vertically in the center; but this is immaterial to the claim of the patent of Feb. 22, 1870, for the reason that the two parts, in order to be operative to be used as dies, must be firmly clamped together before any operation can be performed on the blanks between them, and when so clamped it is essentially a solid die, and is then the V-shaped die C of the first claim of the said patent, and the follower or other part corresponds to the part D of that claim. The V-shaped part of the die is constructed with recesses or cavities corresponding with the recesses and cavities in the corresponding parts of the patent; hence the said 4 Ex. No. 1 shows "the V-shaped die C D, constructed as described" in the patent.

315 The same dies or parts C D of the patent of Feb. 22, 1870, at Figs. 3 & 4, & as stated in the last paragraph, are shown in the other patent referred to in the question, and the application referred to in the last paragraph of the specification of that other patent was the application upon which the patent of Feb. 22, 1870, was issued.

Cross-examined by Mr. FENTON:

X 2. Why is the lower die or Def't's Ex. 1 made in two parts, if you know?

A. I presume it to have been so made to adapt the invention of Morse, as secured in his patent of Feb. 22, 1870, to the making of king bolts with a peculiar-shaped neck, such as I know was Mr. Morse's object in making the dies of that patent divided.

X 3. Are the dies, Figs. 3 & 4, of the patent of 1869 the subject of a separate claim, or are they claimed in combination with other dies?

316 A. In the patent of Feb. 22, 1870, the V-shaped die C D is made a special claim. In the patent of 1869 the same die is claimed in combination with other dies, the two applications being simultaneously filed.

X 4. What difference is there, if any, shown in the patent of Feb. 22, 1870, and the forming dies, Fig. 6, of the pl'ff's reissued patent?

A. The dies represented by Fig. 6 are employed for bending the blank, the arms of which have been previously shaped in the dies, Fig. 5, and therefore do not perform the work that is done by the die C D of the patent of 1870.

X 5. Will you be kind enough to state wherein there is any substantial difference between the die, Fig. 6, of the pl'ff's patent and the dies of Smith patent of Feb. 22, 1870, irrespective of the work done by either?

A. The die, Fig. 6, in the Miller patent is not a V-shaped die in that sense that it enables the swedging or shaping of the arms, as in the Morse patent, and hence is not that die claimed in the

317 Morse patent. The difference is that the Miller patent is not the V-shaped die claimed in the Morse patent, and the Morse patent is. The Miller patent calls that die a U-shaped cavity—that is, its opposite sides are parallel, perpendicular, and nearly to each other.

X 6. Then, if I understand you, the only substantial difference between them is that one is U shaped while the other is V shaped?

A. That is the difference, but not all the difference, because the Miller dies cannot perform the work of the Morse patent.

X 7. Why not?

A. Because a blank, such as is shown in the Morse patent, could not be properly swedged in the dies of the Miller patent.

X 8. Why not?

A. Because they could not; it would be an impracticable thing to do, to draw the arms into that shape; the metal would not stand it.

318 X 9. Wherein consist the difference, if any, of the clamping dies, Def't's Ex. No. 1, and the dies, Fig. 6, of the pl'ff's patent?

A. I have already answered that question in reference to the Morse patent of Feb. 22, 1870, and Fig. 6 of the patent; there is the same difference.

X 10. Were you of counsel for either of the parties, Morse or

Miller, in the application for the Morse patent of Feb. 22, 1870, or the Miller original patent of same date?

A. I was counsel for Morse.

X 11. Was there not an interference declared between them as respects to Miller's claim to die, Fig. 6, and Morse's claim?

A. There was an interference, improperly declared, as I thought, and on my request the examiner of interferences, and in company with one of the attorneys for Miller, the interference was dissolved and sent back to the examiner.

319 X 12. Could a king bolt, provided with a collar, such as shown in Fig. 13 of Morse patent of 1869, be formed in the dies shown in Morse patent of 1870, if the collar was first formed upon the blank?

A. If the dies were divided as Morse divided them, yes, sir.

X 13. In what recesses or cavities would the collar be inserted in such a case?

A. In the case of Mr. Morse's dies they were divided at the center and a cavity made, as in Ex. No. 1, to receive the collar, and then clamped together.

X 14. Does the patent of Feb. 22, 1870, show any such collar cavities, or a lower die divided in the center?

A. It shows only the invention claimed, which is for the die, whether it be divided or not. The illustration does not show a divided die.

JOHN E. EARLE.

320 Sworn and subscribed before me, this fifth day of Jan., 1882.

E. E. MARVIN,
Master pro hac vice.

(Complainants place in evidence a letters patent 141,679 to Fred. Van Patten, assignor to himself, E. D. Clapp.)

J. B. SAVAGE recalled:

Int. 1. In your previous testimony in giving your allowance for wear and tear of the dies in making bolts by the Miller process you stated such allowance at 45 cents per hundred in respect of the Miller dies; please state what is a fair allowance for such wear and tear of the other tools used in making the finished bolt outside of the Miller dies.

A. 25 cents per hundred.

Cross-examination waived.

Complainants rest.

Accounting adjourned to Jan. 23, 1882, 2 p. m., for oral argument.

And on the 3d day of March, 1882, complainants' exception to master's report was filed in the words and figures following, viz:

321 *Complainants' Exceptions.*

United States Circuit Court, District of Connecticut. In Equity.

THE ATWATER MANUF'G CO. *et al.*
v.
THE BEECHER M'F'G CO.

Exceptions taken by the complainant to the report of E. E. Marvin Esq., the master to whom the cause was referred by an order of this court, which report was filed February 3, 1882.

For that the master in his report finds that the 100,509 plain clip king bolts which the defendants made at their shops in infringement of the complainants' dies B, C, D, and E, were so made by means of the dies Nos. 1 and 13, instead of finding that they were made by dies infringing the complainants' series of dies, without designating such dies as the dies Nos. 1 and 13.

C. R. INGERSOLL,
Solicitor for Compl't.

322 And on the 11th day of February, 1882, defendant's exceptions to master's report were filed in the words and figures following, viz:

In the Circuit Court of the United States for the District of Connecticut. In Equity.

THE ATWATER M'N'F'G CO. *et al.*
vs.
THE BEECHER M'N'F'G CO. } No. 259.

Exceptions taken by the Beecher Man'f'g Co., defendant, to the report of E. E. Marvin, Esq., master.

1. The master erred in finding and reporting that at the time covered by the accounting "the opening and bending of the clip arms of king bolts by dies was covered by the said patent to the compl'ts, and also by one to F. B. Morse, dated Feb. 22, 1870."

2. The master erred, for that, conceding that he was correct in adopting the Wilcox (Portchester) dies as the standard of comparison by which to measure def't's alleged savings, he entirely omitted to notice the uncontradicted testimony in the cause that the latter, if operated by machinery instead of in a foot vise, would form and bend as many bolts in a given time as the plaintiffs' forming and bending dies.

3. The master erred in finding and reporting that the hand-made bolts were not as saleable and were less valuable by $1.00 per hundred as compared with die-made bolts, and making a charge therefor at that rate against the def'ts, whereas the proof established the fact that hand-made bolts finished in a clamp die (admitted to be
323 open and free to be used as such) would be just as good and saleable; and that the plaintiffs' bolts equally required to be

so finished in a clamp die to make them marketable, and were in fact so finished.

4. The master erred in charging the defendant with the whole difference in cost between forming and bending the bolt by hand and forming and bending it by pl'ffs' series of dies, and almost in the same sentence finds that one of the dies forming the series, and to which die the whole saving is due, is patented to Morse by a patent dated Feb. 22, 1870. Under such a ruling the defendant would be obliged to account twice, first to the plaintiff, and afterwards to Morse, for the same saving.

5. The master erred in finding and reporting that the bending die alone, as described and shown in the pl'ffs' patent at Fig. 6, is covered by the Morse patent, and, therefore, not free to be used by the defendant and the public.

6. The master erred in finding and reporting that the clamping die, Def't's Exhibit No. 1, as described and shown in defendant's original proofs, and as used by them since the decree, is covered by the Morse patent of Feb. 22, 1870, and, therefore, not free to be used by the def't and the public.

324 7. The master erred in finding and reporting that the def't derived any profit, gain, or advantage from the use of the series of dies adjudged to infringe the plaintiffs' patent.

8. The master erred in not reporting that the defendants were at liberty to use the clamp dies Def't's Exhibit No. 1, as described in the testimony, and that the evidence was overwhelming and uncontradicted that said dies alone will both bend and form the bolt, performing the work done by both the plaintiffs' dies as cheaply and with as good results as the plaintiffs' dies.

9. The master erred in comparing the daily product of the pl'ffs' dies, operated by machinery, with the Wilcox dies operated in a foot vise, and making up an account accordingly, on the basis of an increased daily product, wholly ignoring the uncontradicted evidence in the cause that the Wilcox dies, if operated by machinery, as were the plaintiffs', would produce as large a daily product.

10. The master erred in reporting more than nominal damages against the defendant, because, however the fact may be, the proof failed to show that any gain or saving was due to that part of the process of making a king bolt performed by the pl'ffs' patented series of dies.

325 11. The master erred in reporting more than nominal damages against the defendant, because the evidence established the fact that nothing was gained or saved by the use of the dies as a series, but that the bending die, Fig. 6 of the pl'ffs' patent, could alone have been used to perform the whole work of forming and bending the bolt performed by the series of dies patented by the plaintiff.

12. The master erred in reporting as follows: It is a matter of some doubt whether, of two dies patented to the complainants to be used in a particular series for making a particular article, either one of them can be adopted as the most valuable part of another series for making the same article, without infringement of said

complainants' rights; but while it may be possible that such a claim may be sound as to the Miller patent, said Miller having disclaimed both his opening and forming and his bending die, when used alone, I find, with regard to either of these partial steps, as I have already found in regard to them as a series, taken together, that they were covered by the Morse patent of Feb. 22, 1870, and were, consequently, not open to the public. Under such a ruling the profits belong to Morse, not to the plaintiff.

326 13. The master erred in reporting as follows: "I find that the defendants' clamp die No. 1, when used either to form or bend the arms of clip king bolts, or to do both steps in one act, is undoubtedly used in infringement of the Morse patent of Feb. 22, 1870, if not that of Miller, and was therefore not available to it for such purpose.

14. The master erred in reporting as stated in the last exception, because the court had, in the original case, adjudged Miller to be the prior inventor as against Morse, and for the further reason that clamp dies like Exhibit one had been in use since 1863, by Wilcox and others, whose dies produced in the original case, Exhibits 7 & 8, used since the last-mentioned date, were substantially similar to said clamp die Exhibit 1, and were admitted to be so.

H. T. FENTON,
Feb'y 11, 1882. *Solicitor for Defendants.*

327 And on the 5th day of April, 1882, opinion of court upon exceptions to master's report was filed in the words and figures following, viz:

Circuit Court of the United States for the District of Connecticut.

THE ATWATER MANUFACTURING CO. *et al.*
vs.
THE BEECHER MANUFACTURING CO.

SHIPMAN, *J.*

The plaintiffs' exception to the master's report is sustained. The master, not having had his attention called to the question of the particular dies upon which the defendant made its infringing bolts, used, inadvertently, the language quoted in the exception. The die known as No. 1 was not used as a bending die by the defendant before the injunction. On the contrary, it used the plaintiffs' patented series, but since the injunction has probably used die No. 1.

The inadvertence made no difference in the result which the master reached.

328 All of the exceptions of the defendant are disallowed They are either not true or are immaterial.

The principal point which the defendant makes, and which is presented in various forms in different exceptions, is that it could have made as good and as salable and as cheap blanks by the aid of the single die known as No. 1 as it did make by the aid of the plaintiffs' series of dies; and, therefore, that it saved nothing and made no profit by the use of the plaintiffs' series.

The answer to this proposition is that, if true, it is of no avail to the defendant, because die No. 1, when used as a forging and not as a clamping die, is the V-shaped die patented to F. B. Morse on February 22d, 1870; and, therefore, the use of this die was not open to the public at the time of the infringement. There is no evidence that the Morse patent is invalid. The presumption in favor of its validity has not been successfully attacked.

329 The defendant is not correct in the theory that the Morse single V-shaped die is the U-shaped die of the Miller series, and that therefore such die was open to the public. Whether it is the equivalent of the Miller series, it is not important to consider. Neither is Exhibit No. 1 the same as the U-shaped die of the Miller series. The issue which the defendant attempted to create in regard to the cost of the blanks made upon die No. 1, as compared with the cost of the blanks made by means of the Miller series, was an immaterial issue in this investigation.

CHARLES R. INGERSOLL,
For the Plaintiff.
HECTOR T. FENTON,
For the Defendant.

330 And on the 27th day of April, 1882, the following final decree was made and entered in said cause, viz:

At a stated term of the circuit court of the United States of America for the district of Connecticut, held at New Haven, in said district, on the fourth Tuesday of April, 1882.

Present: The Honorable Nathaniel Shipman, district judge.

THE ATWATER MANUFACTURING COMPANY *et al.*

v.

THE BEECHER MANUFACTURING COMPANY.

This cause having come on to be heard upon the report of Edwin E. Marvin, Esq., one of the masters of this court, to whom it was referred to ascertain and report the gains, profits, and advantages derived, received, or made by the defendants by reason of their
331 infringement of the complainants' letters patent, and also to assess and report the damages sustained by said defendants by reason of said infringement, which report bears date the 4th day of February, 1882, and also upon the exceptions taken to said report on the part of the complainant and also on the part of the defendants, and the said cause having been argued by counsel and due consideration had thereon, it is ordered, adjudged, and decreed, and this court, by virtue of the power and authority therein vested, doth order, adjudge, and decree:

That the complainants' exception to said master's report be sustained, and the defendants' exceptions to said report, severally, be disallowed and overruled, and that subject to said exception of the complainant the report of the master be confirmed.

And it is further ordered, adjudged, and decreed, and this court,

by virtue of the power and authority therein vested, doth further order, adjudged, and decree:

That the defendant pay to the complainants the sum of twenty-one hundred $\frac{64}{100}$ dollars, with interest from April 27th, 1882.

And it is further ordered, adjudged, and decreed that the
332 complainant have execution for such sum so as aforesaid decreed to be paid by the defendant to the complainants.

And it is also ordered that the injunction heretofore granted be made perpetual.

N. SHIPMAN, *District Judge.*

333 I, Edwin E. Marvin, clerk of the United States circuit court for the district of Connecticut, do certify that the foregoing is a true return of the record in said court in the cause of the Atwater Manufacturing Company *et al.* against The Beecher Manufacturing Company.

In witness whereof I have set hereto my hand and the seal of said court, at Hartford, in said district, this 31st day of May, A. D. 1882.

[SEAL.] E. E. MARVIN, *Clerk.*

Endorsed on cover: Connecticut C. C. U. S. No. 224. The Beecher Manufacturing Company, appellant, *vs.* The Atwater Manufacturing Company, Robert R. Miller, and J. B. Savage. Filed June 16, 1882.

114-523

EXHIBITS.

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1884.

No. 224.

THE BEECHER MANUFACTURING COMPANY,
APPELLANT,

vs

THE ATWATER MANUFACTURING COMPANY ET AL.

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1884.

THE BEECHER MANUFACTURING COMPANY, Appellant,
vs.
THE ATWATER MANUFACTURING COMPANY *et al.*
No. 224.

Stipulation of Counsel as to Printing Exhibits.

It is hereby stipulated and agreed, by and between counsel for appellant and appellees, that the clerk of the Supreme Court shall print as an appendix to the record in above case the following exhibits transmitted to him by the clerk of the circuit court, but not certified up in the record from the court below; and the same may be used on the hearing of the above appeal with like effect as though they had been duly certified as part of the transcript of record.

I. Specification and drawings of Miller's reissued patent.
II. Specification and drawings of Miller's original patent.
III. File and contents of Morse's patent of Oct. 26, 1869.
IV. Specification and drawings of Morse patent of Oct. 26, 1869.
V. Specification and drawings of Morse patent of Feb'y 22, 1870.
VI. Drawing annexed to Phelps' specification.
VII. The outside front cover of H. D. Smith & Co.'s catalogue, and the drawing on upper half of page 21 of said catalogue.
VIII. Exhibit def'ts' account produced before the master.

H. T. FENTON,
Of Counsel for Appellant
C. R. INGERSOLL,
GEO. S. PRINDLE,
Counsel for Appellees.

Nov'r 11, 1884.

2 UNITED STATES PATENT OFFICE.

ROBERT R. MILLER, of Plantsville, Connecticut, Assignor, by mesne assignments, to himself, J. B. Savage, and Atwater Manufacturing Company.

Improvement in Series of Dies for Forming the Heads of King Bolts.

Specification forming part of Letters Patent No. 100,053, dated February 22, 1870; reissue No. 8694, dated May 6, 1879; application filed March 4, 1879.

To all whom it may concern:

Be it known that I, Robert R. Miller, of Plantsville, in the county of Hartford and State of Connecticut, did invent certain new and useful improvements in dies for forming the heads of king bolts, for which letters patent No. 100,053 were issued to me upon the 22d day of February, 1870, which letters patent have been found defective in that the specification and claims do not cover all of the invention shown and described in the application filed by me upon the

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1884.

THE BEECHER MANUFACTURING COMPANY, Appellant,
vs.
THE ATWATER MANUFACTURING COMPANY *et al.*
No. 224.

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I. Specification and drawings of Miller's reissued patent.
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VII. The outside front cover of H. D. Smith & Co.'s catalogue, and the drawing on upper half of page 21 of said catalogue.
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H. T. FENTON,
Of Counsel for Appellant
C. R. INGERSOLL,
GEO. S. PRINDLE,
Counsel for Appellees.

Nov'r 11, 1884.

2 UNITED STATES PATENT OFFICE.

ROBERT R. MILLER, of Plantsville, Connecticut, Assignor, by mesne assignments, to himself, J. B. Savage, and Atwater Manufacturing Company.

Improvement in Series of Dies for Forming the Heads of King Bolts.

Specification forming part of Letters Patent No. 100,053, dated February 22, 1870; reissue No. 8694, dated May 6, 1879; application filed March 4, 1879.

To all whom it may concern:

Be it known that I, Robert R. Miller, of Plantsville, in the county of Hartford and State of Connecticut, did invent certain new and useful improvements in dies for forming the heads of king bolts, for which letters patent No. 100,053 were issued to me upon the 22d day of February, 1870, which letters patent have been found defective in that the specification and claims do not cover all of the invention shown and described in the application filed by me upon the

31st day of July, A. D. 1869. Now, therefore, being desirous of reissuing the said letters patent, I have prepared and do hereby declare the following to be a full, clear, and exact description of my said invention, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a perspective view of the blank used in the formation of my king bolt. Fig. 2 is a like view of the same after passing through the forming dies. Fig. 3 is a perspective view of said blank after having been operated upon by the bending dies. Fig. 4 is a like view of the completed king bolt. Fig. 5 is a perspective view of the dies used for forming the clip arms, said dies being separated from each other. Fig. 6 is a like view of the dies used for bending said clip arms to shape. Fig. 7 is a central, longitudinal section of said forming dies as they appear when closed together with a clip blank within the lower die; and Figs. 8 and 9 are, respectively, longitudinal and cross sections of the bending dies, upon central lines, as they appear with the completed king bolt between their faces.

Letters of like name and kind refer to like parts in each of the figures.

The design of my invention is to enable clip king bolts to be easily and cheaply made by machinery; to which end it consists, principally, in the forming dies constructed in the manner substantially as hereinafter shown.

It consists, further, in the series of dies, substantially as and for the purpose hereinafter shown and described.

In the construction of king bolts I employ a blank, A, which is formed by splitting the end of a metal bar longitudinally for a distance of about two inches, turning the forks or arms *a* outward at substantially a right angle with each other, and then severing said blank from the bar at such distance below said arms as to leave the necessary metal for forming the spindle.

The next operation consists in giving form to the arms *a*, which is accomplished by the following-described means: Within the upper side of a metal block, B, is formed a vertical, central opening, *b*, that corresponds in general shape and diameter to the like features of the body of the blank A, and has such depth as may be desired for said part. Extending lengthwise of the block B is a half-round groove, *b'*, which intersects the opening or recess *b*, and has a slightly greater depth at its ends than at its longitudinal center, and a slightly greater width at the latter point than at said ends. At the upper end of said recess *b* the corners are rounded, as shown. The blank A is suitably heated, and placed within the die B, its body being within the recess *b*, and its arms *a* over the grooves *b'*, after which a plane-faced upper die, C, is caused to impinge one or more times upon said blank until the latter is caused to conform to and fill said recess and groove, said arms, being in a line with each other, as seen in Fig. 2. The blank A is now relieved of its projecting fin by any suitable means, after which it is operated upon by a second set of dies as follows: A block, D, is provided with a **U**-shaped cavity, *d*, within and extending longitudinally across its upper side, and has at the bottom of such cavity a vertical recess, d^1, that corre-

2 Sheets—Sheet 1

R. R. MILLER

Assignor, by mesne assignments, to himself, J. B. SAVAGE & ATWATER MANUFACTURING Co.

Series of Dies for Forming the Heads of King Bolts

No. 8,694. Reissued May 6, 1879.

No. 224
Bucher Manuf'g Co.
v.
Atwater Manuf'g Co
Page 3

Fig. 1.

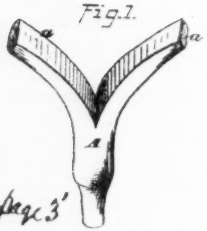


Fig. 2.

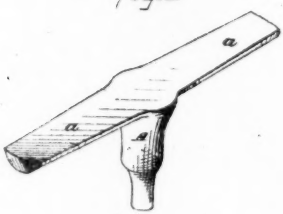


Fig. 3.

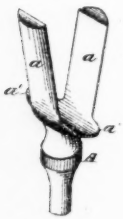
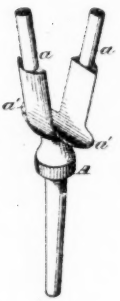


Fig. 4.



WITNESSES.
Jas. H. Hutchinson.
Henry C. Hazard

INVENTOR.
R. R. Miller, by
Munn & Co Law Pat Attys

No. 224
Beecher Manuf'g Co.
v.
Atwater Manuf'g Co.
page 32

2 Sheets—Sheet 2.

R. R. MILLER,

Assignor, by mesne assignments, to himself, J. B. SAVAGE & ATWATER MANUFACTURING Co

Series of Dies for Forming the Heads of King Bolts.

No. 8,694. Reissued May 6, 1879.

Fig. 5.

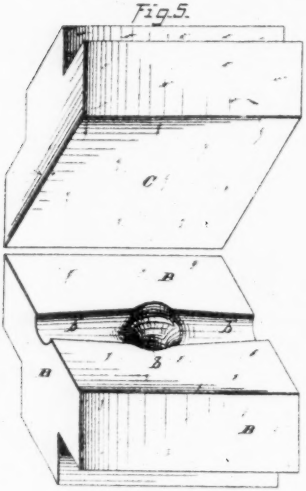
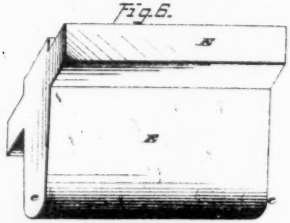


Fig. 6.



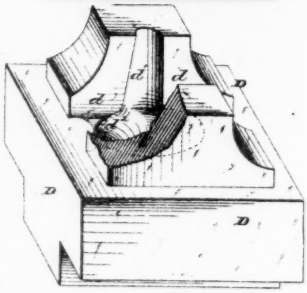


Fig. 7.

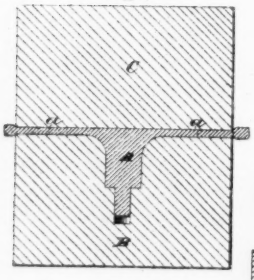


Fig. 9.

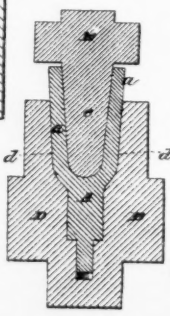
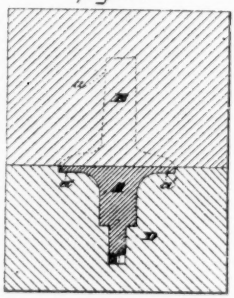


Fig. 8.



WITNESSES.

Jas. E. Hutchinson

Henry C. Hazard

INVENTOR.

R. R. Miller, by

Pennie & Co. his Attys

sponds to the size and shape of the body of the blank A. From the recess d^2 a groove, d^1, extends outward and upward within the sides of the cavity d, and has such depth and transverse dimensions and shape as will cause it to conform to the like features of the finished arms a of the blank A, said grooves being increased in width at the bottom of said cavity until they extend upon each side of said recess d^2 a distance equal to the entire breadth of other portions of said arms. An upper die, E, is provided upon the lower side
3 with a projection, e, which corresponds in shape and size to the cavity d of the die D, and fills the same when said dies are brought together. The blank A is taken as it comes from the die B and placed across the cavity d of the die D, the body of said blank being directly over the recess d^2, and its arms over and in a line with the grooves d^1, after which the die E is caused to strike one or more blows upon said blank, such operation causing the latter to be bent to the form shown in Fig. 3, and the surplus metal at the point where said arms join said body to be thrown outward and form wings or lips a'. The king bolt is completed by drawing out the shank A, and by rounding and threading the ends of the clip arms a, as shown in Fig. 4, any desired or usual means being employed for such purpose.

Having thus fully set forth the nature and merits of my invention, what I claim as new is—

1. The die B b b' and the die C, constructed and combined substantially as and for the purpose shown.

2. The series of dies B, C, D, and E, for forming clip king bolts, substantially as shown and described.

In testimony that I claim the foregoing I have hereunto set my hand this 21st day of February, A. D. 1879.

R. R. MILLER.

Witnesses:
GEO. S. PRINDLE.
MARCUS H. HOLCOMB.

[Endorsed.] Atwater Mf'g Co. *v.* Beecher Mf'g Co. I certify that this exhibit was used in this case. Attest: E. E. Marvin, clerk.

(Here follows two diagrams, marked page 3.)

4 UNITED STATES PATENT OFFICE.

ROBERT R. MILLER, of Plantsville, Assignor to himself and J. B. Savage, of Southington, Connecticut.

Letters Patent No. 100,053, dated February 22, 1870.

Improved Series of Dies for forming the Heads of King Bolts.

The schedule referred to in these letters patent and making part of the same.

To all whom it may concern:

Be it known that I, Robert R. Miller, of Plantsville, in the county

of Hartford, and State of Connecticut, have invented new and improved dies for forming king bolts for wagons, and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings forming part of this specification, in which—

Figure 1 represents the rough king bolt after being split and before being placed in the die.

Figure 2 is a longitudinal section of the die by which the clip arms of the bolt are formed.

Figure 3 is a cross section of the same, taken through the line $x\ x$, Fig. 2.

Figure 4 is a cross section of the dies by means of which the clip arms are bent into proper form and the wings are formed.

Figure 5 is a longitudinal section of the same taken through the line $y\ y$, Fig. 4.

Figure 6 is a perspective view of the bolt when finished.

My invention has for its object to furnish an improved set of dies, by means of which the clip arms and wings of king bolts may be quickly, conveniently, and accurately formed; and

It consists in the series of dies constructed and operating as hereinafter more fully described.

A represents the die by which the clip arms are formed.

The die A is formed with a round hole, a^1, in its center, to receive the end of the round rod from which the upper part of the bolt is to be formed.

From opposite sides of the central hole a^1 semi-cylindrical grooves a^2 are formed, extending out for a suitable distance.

One end of the rod from which the king bolt is to be formed is split for about one and a half or two inches, and the parts are turned down to about at right angles with the body of the said rod. This naturally forms a collection or thickening of metals at the angles or bends.

The rod thus prepared is then placed in the die A, and struck with a drop forming the clip arms, and forcing the surplus metal into the ring-like cavity a^3 of the die A, around the hole a^1.

The partially formed bolt is then removed from the die A, and placed across the die B, the arms resting on the projections b^4.

The die B is formed with a hole, b^1, in its center, to receive the part of the bolt which is to form the upper part or spindle. From the opposite sides of the hole b^1, half round grooves b^2 lead out for sufficient distances. Upon the upper side of the die B, upon the opposite sides of the hole b^1, are formed upwardly-projecting lugs or flanges b^4, upon the inner side of which are formed half-round grooves, to receive the shoulders of the clip arms of the bolt, and give them the proper bend or form while the wings are being formed in the grooves b^2.

The wings or lips are formed by pressing out the metal heretofore described as being pressed into the ring-like cavities a^3 of the die A, into the grooves b^2 of the die B, by the die C, their size being limited by the capacity of the ring-like cavities a^3, and the consequent

R. R. Miller, 2 Sheets, Sheet 1.

Manf. Carriage Irons

No. 100053. Patented Feb. 22. 1870.

No. 2281
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p. 44

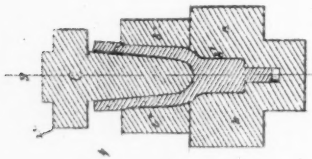


Fig. 4

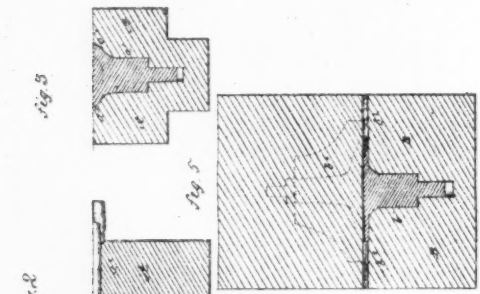


Fig. 3

Fig. 5

Fig. 2

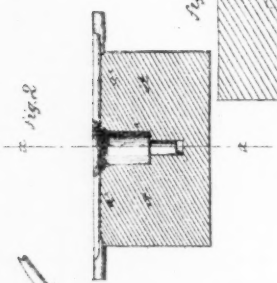


Fig. 1

Witnesses:
W. Almond
A. H. Brooks

Inventor:
R. R. Miller
Per Munn & Co
Attorneys

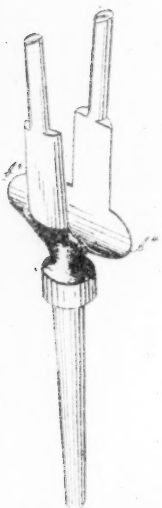
2 Sheets Sheet 2.

A. R. Miller,

Manf. Carriage Irons

No 100,053. Patented Feb 22. 1870

Figure 6



No. 7224
Beecher Manuf'g Co
D. 4 2
v
Allwater Manuf'g Co

Witnesses:
Edw Kemm
A McDanner

Inventor:
Robert R. Miller
by Munn & Co
Attorneys

amount of metal to be forced into the grooves b^2, and their form being that which the said metal will naturally take when forced into the said grooves b^2 by the action of the said die C, as indicated at the point D in Fig. 5. These wings b^4 are shown in perspective in Fig. 6, sheet 11, and in dotted lines in Fig. 5, sheet 1.

C is the upper or movable die, the face of which is made semi-cylindrical in form, to form the wings of the king bolt, and the sides of which are so formed as to press the clip arms into the grooves of the flanges b^4, and thus bend or form them into proper shape.

I wish it to be understood that I do not claim either of the dies herein described separately; but having thus described my invention,

I claim as new and desire to secure by letters patent—

The series of dies A, B, and C, for forming the clip arms and wings of the lower ends of king bolts for wagons, said dies being constructed and operating substantially as herein shown and described.

R. R. MILLER.

Witnesses:
THEO. F. LEWIS,
H. R. BRADLEY.

(Here follow 2 diagrams, marked page 4.)

5 DEPARTMENT OF THE INTERIOR, UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the files of this office of the file wrapper and contents in the matter of the letters patent granted F. B. Morse, October 26, 1869, No. 96251, for improved series of dies for forming king bolts.

In testimony whereof I, E. M. Marble, Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed, this twenty-first day of August, in the year of our Lord one thousand eight hundred and eighty, and of the Independence of the United States the one hundred and fifth.

[SEAL.] E. M. MARBLE,
Commissioner.

6 B.

F. B. MORSE, of Plantsville, Connecticut.

Application for Letters Patent for Improvement in Dies for Forging King Bolts.

To the Commissioner of Patents:

Your petitioner prays that letters patent may be granted to him for the invention set forth in the annexed specification, and he hereby appoints John E. Earle, of New Haven, Conn., attorney, with full power of substitution and revocation, to prosecute this application, to make alterations or amendments therein, to receive

the patent, and to transact all business in the Patent Office connected herewith.

F. B. MORSE.

[50 Cents Internal Revenue Stamp.]

7 To all whom it may concern:

Be it known that I, F. B. Morse, of Plantsville, in the county of Hartford and State of Connecticut, have invented a new improvement in dies for forging king bolts; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Fig. 1, the upper part, and
Fig. 2, the lower part of the opening die;
Fig. 3, the upper, and
Fig. 4, the lower part of the forming die;
Fig. 5, the upper, and
Fig. 6, the lower part of the trimming die;
Fig. 7, the upper, and
Fig. 8, the lower part of the die for completing the neck;
Fig. 9, a longitudinal section of the last-named lower die;
Fig. 10, the blank as prepared for the first operation;
Fig. 11, as opened by the first operation;
Fig. 12, as from the second operation;
Fig. 13, after the neck is formed by the last operation;
Fig. 14, a top view of the bolt complete.

8 This invention relates to an improvement in the manufacture of the article of carriage hardware, known to the trade as "king bolts," and it consists in a series of dies for forging the said bolts.

Corr'ns, as see am'd't filed Oct. 7, 1869.

The blank, as seen in Fig. 10, is forged in the usual manner, the head split, then heated, is placed into the die A, Fig. 2, when the follower or other part, B, of the die is struck on to it, the central portion *a* passing down into the slit and opening the ends, as seen in Fig. 11, partially forming the head, then removed to the die C, Fig. 4, which is formed so as to spread the head of the bolt and shape the outer surfaces of the two ends above the head. Set into this die the follower or other part D is struck on to the blank forming it, as seen in Fig. 12, and spreading the head as denoted at *d d*, Fig. 14, then the bolt is placed into the trimming die E, Fig. 6, and the follower F struck thereon to cut away the fin or surplus metal; then the neck of the bolt is formed up to the broken line, Fig. 13, by means of the dies commonly used for this purpose, or other suitable dies.

Corr'ns, as see am'd't filed Oct. 17, 1869.

To complete the head above that line the bolt is placed into the die G, Fig. 8, which is constructed, as seen in Fig. 9, so that when the bolt is placed therein, a movable part, H, of the die is placed in against the neck, [insert "A" of the am'd't filed Oct. 7, 1869,]

then the follower or other part I, of the die is struck thereon, and the head is finished.

Thus by these several operations the bolt is finished complete, including the neck.

9 By preference I employ the opening dies shown in Figs. 1 & 2; yet it will be evident that the dies in Figs. 3 & 4 may be employed as the opening die and thus dispense with the opening die.

In application A, filed in even date herewith, the dies shown in Figs. 3, 4, 5, & 6, are made the subject of the said application for patent, but in that operation the neck is not complete.

I claim as my invention——

[Omit & insert "B," of the amend't filed Oct. 7, '69.]

F. B. MORSE, *Inventor.*

Witnesses:
A. J. TIBBITS,
J. H. SHUMWAY.

10 STATE OF CONNECTICUT, }
County of New Haven, } *ss:*

F. B. Morse, being duly sworn, deposes and says: That he verily believes himself to be the original and first inventor of the improvement in dies for forging king bolts, described in the foregoing specification; that he does not know or believe that the same was ever before known or used, and that he is a citizen of the United States.

F. B. MORSE.

Sworn to and subscribed before me, this 22d day of Sept., 1869.
JOHN E. EARLE,
Justice Peace.

[Endorsed:] 118—3549. "Case B." "Specification." Sept. 25, 1869. Patent Office, U. S. A. Sept. 25, 1869.

11 ("Duplicate" for file, Case "B.")

U. S. PATENT OFFICE,
WASHINGTON, D. C., *Septem'r* 30, 1869.

F. B. MORSE, *Care of J. E. Earle, New Haven, Conn't.*

SIR: Please find below the communication of the examiner in charge in the matter of your two several applications "A" and "B," for patents for "dies for forging king bolts," filed Septem'r 25, 1869.

Very respectfully, ——— ———,
Commissioner.

EXAMINER'S ROOM, No. 6.

In the matter of the application above referred to, the applicant above named has now pending before the office two applications,

marked respectivly "A" and "B," for improved dies for forming king bolts for carriages.

In application "A" two pairs of dies are described, one for swaging the blank and the other for trimming the clips and head.

12 In application "B" four pairs of dies are described, lettered respectively A and B, C and D, E and F, and G and H, of which C and D and E and F are identical with the two pairs of dies described in application "A."

In application "A" claim is made to "dies for forging king bolts for carriages, constructed substantially as described."

In application "B" claim is made to "the dies G, E, and G, with their respective followers, constructed as described." Thus the dies C and D and E and F are claimed in both applications; or, in other words, two patents are asked for the same invention.

Of specification "A," paragraph on 3d page beginning with "I prefer," is inconsistent with other parts of the specification, and particularly with the 1st paragraph on 2d page, and with the claim. Specification "B" is objectionable in the following particulars, viz: The invention is said (page 2) to relate to "improvements in the article of king bolts," and immediately following this is the statement that the invention consists "in the construction and combined operation of a series of dies," while the claim is, in substance, to

13 the several pairs of dies singly. Thus the invention may be an improved article, a series of dies, or every pair of three different pairs of dies.

As to the pair of dies G and H, it is manifestly impossible for it to produce the result alleged of it, or even if it were possible, it would not be possible to withdraw the bolt from it.

For reasons above stated, both applications ("A" and "B") are rejected.

(Signed) J. W. JAYNE, *Exam'r.*

("Duplicate" for file, case "B.")

[Endorsed:] (Duplicate for file, Case B.) 118—3549. Case "B." "Office letter" to F. B. Morse. Sept. 30, 1869.

14 "Amendments made in body of specification."

CASE B.

Application of F. B. Morse for Patent for Dies for Forging King Bolts.

To Comm'r of Patents:

SIR: I hereby amend my spec. by inserting after the word "the," in first line of 2d pp. of spec., the words: "manufacture of the," and strik'g out the words "the construction and combined operation of," in same claus-; and further, by strik'g out the words "by other dies curved," in 20th line of same p., and by inserting after "Fig. 13," in next line, the following: "By means of the dies commonly used for this purpose, or other sutable dies."

Also by inserting after the word "neck," in the 26th line of same page, the following:

"A."—"to complete the die around curved part of the neck previously formed, so that in the completed die that part of the neck above the said broken line is formed, the movable part H permitt'g the insertion and removal of the bolt from the die, when the bolt has thus been placed in the said die."

15 And I further amend by strik'g out the claim and insert'g in lieu thereof the following:

"B."—The series of dies C-D, E-F, and G-I, constructed as described to form king bolts for carriages.

Resp'y, F. B. MORSE.
By his att'y, JOHN E. EARLE.

[Endorsed:] 118—3549. Case "B." Amendment filed Oct. 7, 1869. F. B. Morse. Dies for forging king bolts. Patent Office, U. S. A., Oct. 7, 1869.

16 U. S. PATENT OFFICE,
WASHINGTON, D. C., *Octo'r* 9, 1869.

F. B. MORSE, care of J. E. EARLE,
New Haven, Conn.

SIR: Please find below the communication of the examiner in charge in the matter of your application for patent for "dies for forging king bolts," Case "B," filed Sept. 25, 1869.

Very respectfully, ——— ———,
Commissioner.

EXAMINER'S ROOM, No. 6.

In the matter of the application above referred to, it has been found, after the case had been passed for issue, that the model is deficient in not showing the shearing die "E F," (the exhibit of that die belonging to case "A" in "interference"), the issue of the patent (as the cases are distinct from each other) must necessarily be suspended until the missing die "E F" is forwarded to complete the model.

J. W. JAYNE, *Exam'r.*

[Endorsed:] 118—3549. "B." Office letter to F. B. Morse. Oct. 9, 1869.

17 NEW HAVEN, CONN., *Oct.* 16, 1860.

In the matter of the application for letters patent for dies for forging king bolts, by F. B. Morse, "Case B."

To the Hon. Commissioner of Patents:

SIR: In accordance with office letter of Oct. 9, I herewith send new model, additional—to complete—in the above application.

Respectfully, JOHN E. EARLE,
Per A. J.

[Endorsed:] 118–3549. Attorney's letter. Oct. 20, 1869. Patent Office, U. S. A. Oct. 20, 1869.

18 *Memorandum of Fee Paid at U. S. Patent Office.*

$20 check.
Inventor, F. B. Morse.
Invention, dies for forging king bolts, "B."
Date of payment, Oct. 14, 1869.
Fee, $20.
Solicitor, John E. Earle, New Haven, Conn., solicitor of patents.

[Endorsed:] Patent Office, U. S. A. Oct. 15, 1869.

19 118 CASE B.

3549. "B." 1869.
No. 96251.

F. B. Morse, of Plantsville, county of Hartford, State of Conn't.

Dies for forging king bolts.

Rece'd Sept. 25, 1869.
Petition, " " "
Affidavit, " " "
Specification, " " "
2 drawings, " " "
Model, " " "
Cert. dep.
1 cash, $15, Sept'r. 25, 1869.
Add'l fee cert.
1 " " cash $20, Oct 15, 1869.
Examined Oct. 8, 1869. Jayne.
2. Issue, Grinnell, Oct. 8, 1869.
3. Patented Oct. 26, 1869. X.
5. Recorded vol. —, page —.
Circular, Oct. 12, 1869.

J. E. EARLE,
New Haven, Ct.

1869.

20 1869.

V. Sept. 29, 1869, "rejected."
Oct 8, passed for issue.
Imp'd series of dies for forming king bolts.
Spec., 50ct.
Ex'd: E. A. M.
M. McK.

1869.

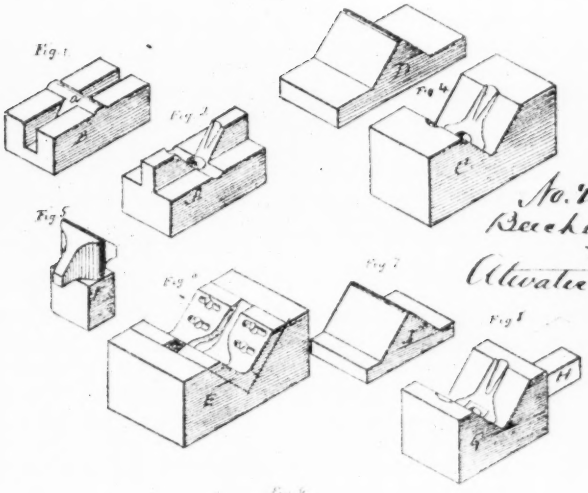
(Here follows diagram, marked page 20.)

[Endorsed:] Exhibit 16. I certify that this exhibit was used in this case. Attest: E. E. Marvin, clerk.

F. B. Morse,

King Bolt Die.

No. 96251 Patented Oct. 26. 1869



No. 72 of
Bachen Manuf'g Co.
v.
Alvarado Manuf'g Co

Witnesses
C. J. Tebbetts
J. H. Sherman

F. B. Morse
Inventor
By his Attorney
John C. Earl

21 UNITED STATES PATENT OFFICE.

F. B. MORSE, of Plantsville, Connecticut.

Letters Patent No. 96251, dated October 26, 1869.

Improved Series of Dies for forming King Bolts.

The schedule referred to in these letters patent and making part of the same.

To all whom it may concern:

Be it known that I, F. B. Morse, of Plantsville, in the county of Hartford, and State of Connecticut, have invented a new improvement in dies for forging king bolts; and I do hereby declare the following, when taken in connection with the accompanying drawings, and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, the upper part, and
Figure 2, the lower part of the opening die.
Figure 3, the upper, and
Figure 4, the lower part of the forming die.
Figure 5, the upper, and
Figure 6, the lower part of the trimming die.
Figure 7, the upper, and
Figure 8, the lower part of the die for completing the neck.
Figure 9, a longitudinal section of the last-named lower die.
Figure 10, the blank, as prepared for the first operation.
Figure 11, as opened by the first operation.
Figure 12, as from the second operation.
Figure 13, after the neck is formed by the last operation.
Figure 14, a top view of the bolt complete.

This invention relates to an improvement in the manufacture of the article of carriage hardware, known to the trade as "king bolts," and consists in a series of dies for forging the said bolts.

The blank, as seen in Fig. 10, is forged in the usual manner. The head split, then heated, is placed into the die A, Fig. 2, when the follower, or other part, B, of the die is struck on to it, the central portion *a* passing down into the slit and opening the ends, as seen in Fig. 11, partially forming the head, then removed to the die C, Fig. 4, which is formed so as to spread the head of the bolt and shape the outer surfaces of the two ends above the head.

Set into this die, the follower or other part, D, is struck on the blank forming it, as seen in Fig. 12, and spreading the head as denoted at *d d*, Fig. 14. Then the bolt is placed into the trimming die E, Fig. 6, and the follower F struck thereon to cut away the fin, or surplus metal. Then the neck of the bolt is formed up to the broken line, Fig. 13, by means of the dies commonly used for this purpose, or other suitable dies.

To complete the head above that line, the bolt is placed into the die G, Fig. 8, which is constructed as seen in Fig. 9, so that when

the bolt is placed therein, a movable part, H, of the die is placed in against the neck, to complete the die around curved part of the neck previously formed, so that in the completed die, that part of the neck above the said broken line is formed, the movable part H permitting the insertion and removal of the bolt from the die, when the bolt has thus been placed in the said die. Then the follower or other part, I, of the die is struck thereon and the head is finished.

Thus, by these several operations, the bolt is finished complete, including the neck.

By reference, I employ the opening dies, shown in Figs. 1 and 2, yet it will be evident that the dies in Figs. 3 and 4 may be employed as the opening die, and thus dispense with the opening die.

In application A, filed in even date herewith, the dies shown in Figs. 3, 4, 5 and 6, are made the subject of the said application for patent, but in that operation the neck is not complete.

I claim as my invention—

The series of dies C D, E F, and G I, constructed as described, to form king bolts for carriages.

F. B. MORSE.

Witnesses:
A. J. TIBBITS.
J. H. SHUMWAY.

(Here follows diagram, marked page 21.)

22 UNITED STATES PATENT OFFICE.

F. B. MORSE, of Plantsville, Connecticut.

Letters Patent No. 100,178, dated February 22, 1870.

Improved Die for Forming the Heads of King Bolts.

The schedule referred to in these letters patent and making part of the same.

To all whom it may concern:

Be it known that I, F. B. Morse, of Plantsville, in the county of Hartford and State of Connecticut, have invented a new improvement in dies for forging king bolts; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a perspective view of the lower part of the first die;

Figure 2, a perspective view of the upper part, inverted;

Figure 3, the blank before the operation of the dies;

Figure 4, an under-side view of the bolt after the operation of the dies;

Figures 5 and 6, the trimming dies; and in

Figure 7, an under-side view, with the bolt complete and trimmed.

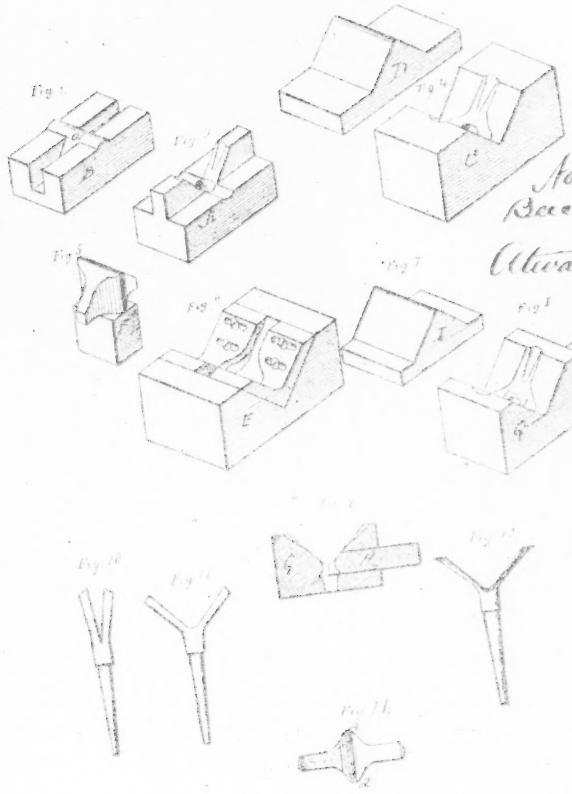
This invention relates to an improvement in dies for forging king

F. B. Morse,

Ring Bolt Die.

Patented Oct. 26. 1869.

No. 96251



No. 224
Beecher Manuf'g Co.
- p. 21
v.
Ulverton Manuf'g Co

Witness
A. J. Lefebvre
J. W. Shumway

F. B. Morse
Inventor
By his Attorney
Edward Earle

F. B. Morse,

Manf Carriage Irons.

No 100,178. Patented Feb. 22. 1870.

No. 2224
Beecher Manuf'g Co.
v.
Atwater Manuf'g Co.
p. 22

Fig 1

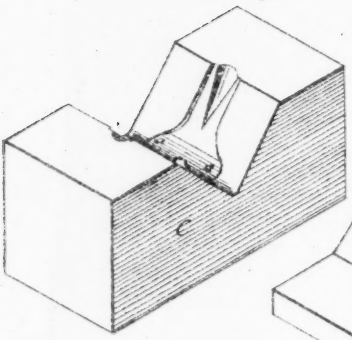


Fig 2.

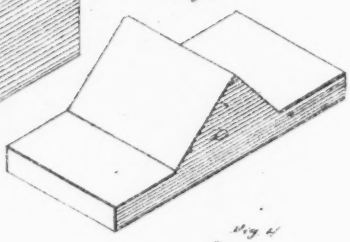


Fig 3

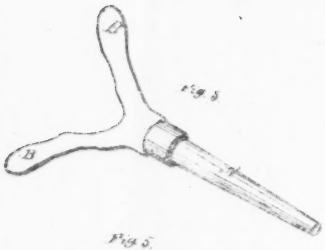


Fig 4

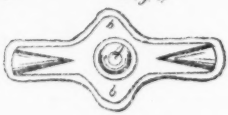


Fig 7

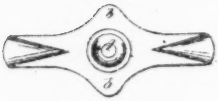


Fig 5.

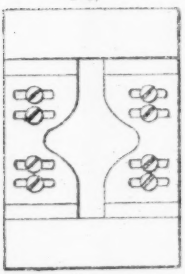
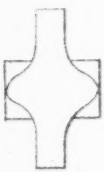


Fig 6



F. B. Morse
Inventor

By his Attorney
John E Earle

Witnesses
D. H. Shumway
a. J. Tibbits

J. Phelps.
Fifth Wheel.
No. 59,642. Patented Nov. 13, 1866.

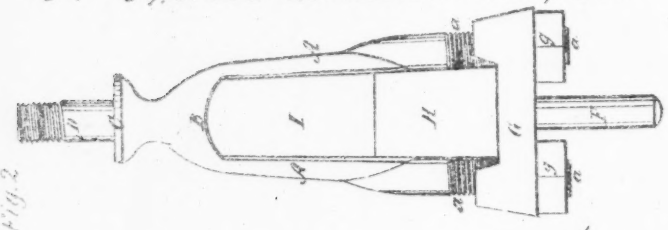


Fig. 2

No. 224
Buckeye Manuf'g Co.
vs.
Hiwater Manuf'g Co.
p. 22

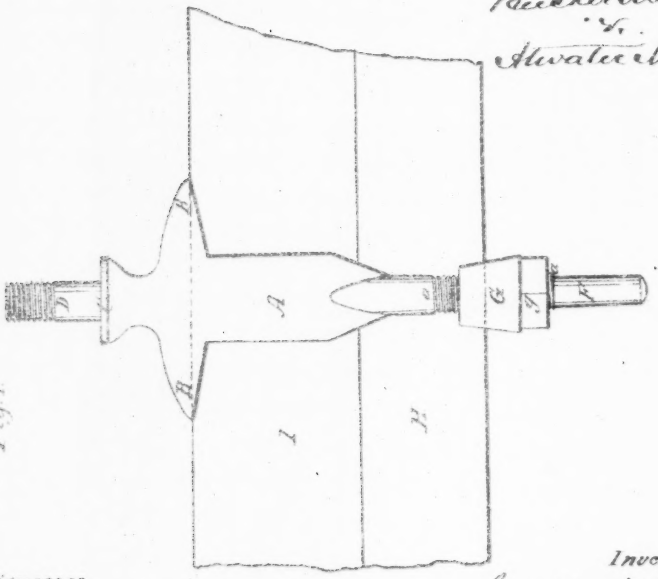


Fig. 1

Witnesses
E. J. Brown.
S. Browne

Inventor.
James P. Phelps.
By his Atty
S. Browne.

bolts for carriages, the object being to produce such bolts in the desired shape without welding and at a single heat; and

The invention consists in the construction of a die so as to strike into the divided head of the blank and form the clip, and spread the base of the clip so as to afford a larger bearing to strengthen the bolt laterally.

The blank, as seen in Fig. 3, is drawn to form the bolt A in the usual manner, and the head divided into two parts, B B. The blank, then heated, is placed into the die, seen in Fig. 1, formed to receive the bolt in the center, and its two sides, forming a V shape, are each cut into the desired form for the two parts of the clip, and at the center, as at *a a*, spread laterally, so as to give a longitudinal transverse bearing to the head of the bolt.

The bolt, placed in the lower die C, the upper part D corresponding to the V shape of the lower part, is struck down into the divided part of the head, spreading and forcing the two parts into each side of the die, and the head extending out into the parts *a a*, the upper side of the head will be flat and of V shape, corresponding to the part Fig. 2 of the die. The bolt thus formed is then placed into the die, Fig. 5, and adjusted so as, by means of the part Fig. 6 dropping thereinto, will trim the edges of the clip and the head, cutting away the fin formed by the first operation; leaving the bolt complete as an article of manufacture, and as shown in Fig. 7.

By this construction the head is spread, as at *b*, giving a lateral bearing to support and strengthen the bolt. The bolt is then ready for market, and is adapted to further use by consumers in the usual manner for this class of bolts.

I prefer to form the clip part or ends of the clip as I have shown and described, but it will be observed that the principal object of my invention—that is, the spreading of the head of the bolt—would be accomplished by the central portion of the dies only; that is, the object would be accomplished were the upper part of the dies moved down to the broken line, Fig. 1.

Thus, it will be observed, by a single heat, and practically by one operation, the head of the bolt and the clip are formed in the most perfect manner.

I claim as my invention—

1. The V-shaped die C D, constructed as described, so as to form the head of king bolts at one operation.

2. The trimming dies, constructed as described, to trim the surplus metal from the head of king bolts.

F. B. MORSE.

Witnesses:
A. J. TIBBITS.
J. H. SHUMWAY.

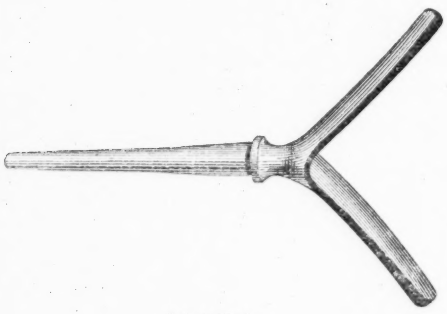
(Here follow 2 diagrams, marked page 22.)

[Endorsed:] Smith Ex. No. 2. Atwater M'f'g Co. *v.* Beecher M'f'g Co. I certify that this exhibit was used in this case. Attest: E. E. Marvin, clerk.

23 EXHIBIT 12.

Price List of H. D. Smith & Co., Plantsville, Conn.—1868.

24 Clip King Bolts, made of Norway iron.



List Price.

	Per doz.
No. 2, size for ordinary buggies	$4 00
No. 1, " light "	4 00

These king bolts are brought to a uniform size and taper, are superior to any we have heretofore sold, and, in our opinion, to anything of the kind offered in market.

I certify that this exhibit was used in this case.
Attest: E. E. MARVIN, *Clerk.*

25 United States Circuit Court, District of Connecticut.

THE ATWATER MANUFACTURING CO. *et al.*
vs.
THE BEECHER MANUFACTURING CO. } In Equity.

The defendants, The Beecher Manufacturing Company, in compliance with the order of the master made August 12, 1881, and supplemental order made August 15, 1881, subject to reserved objections and exceptions thereto filed by the defendants, account and make answer as follows:

I. Since May 6, 1879, to the date of the decree, the defendants have made several sizes of clip king bolts, aggregating in number 100,509, all like Exhibit No. 10, (plain and not flanged), by means of the dies Exhibits Nos. 1 and 13, as part of the process or machinery used in their manufacture.

II. In such manufacture the defendants have made and used since May 6, 1879, about sixty (60) solid forming dies all like Exhibit 13, which were made of cast-iron and cost about $3.00 each. Also since that date one new set of dies like Exhibit 1, for shaping the clip arms, at a cost of about $30.00, and had on hand at that time four sets of such last mentioned dies. Most of these dies have been worn out in the process of such use.

III. In the manufacture of such bolts, other dies and machinery, referred to in the record, and in no manner connected with
26 the plaintiffs' alleged invention, were used, viz: Dies for trimming off fins, dies for forming collar, and dies for drawing out stem, all of which were and are indispensable and absolutely necessary to be used in such manufacture.

4. These defendants are unable to say that the five sets of dies like Exhibit 1 were always or ever used by them in combination with the sixty dies like Exhibit 13, or any particular set or sets of such dies. The latter were of cast-iron and rapidly wore out; while the former were required to be of steel, and were therefore much more durable and lasting. One of the dies, No. 1, was used in every case to finally shape the clip arms after one of the dies, No. 13, had been used to give general form to the bolt; the bolt being subjected, however, to the two intermediate processes of trimming off fins in a trimming die, and forming the collar in a die designed for that purpose. And such last mentioned processes were necessarily intermediate.

5. We have made no profit, gain, or saving, in the use of these dies Exhibits 1 and 13, for the manufacture of clip king bolts, as compared with other and different means equally as cheap and efficient for the purpose and free to be used by the public; nor in the use of them as a series of dies. We could have used either of them singly, to the exclusion of the other, to like advantage and with analagous results. After the bolt had been given general form and shape by means of the dies Exhibit 13, all the beneficial results obtained by the subsequent use of the dies Exhibit 1 could be had by other and different means equally as cheap and efficient, and
27 free to be used in the place of such dies; or the dies Exhibit 1 could be and have been used for both of the operations of originally forming the bolt, and finally giving shape to the clip arms, thus dispensing with the die Exhibit 13. We used both the dies for the purpose, and as a series in the order mentioned in the previous answer, merely for convenience of operation, but without any saving or gain in such use.

D. F. SOUTHWICK, *Sec'y.*

Subscribed and sworn to before me, this 15th day of September, A. D. 1881.

E. E. MARVIN, *U. S. Com'r.*

(Endorsed:) Exhibit Defendants' Account. E. E. Marvin, Master, *p. h. v.* Filed Feb. 3, 1882. E. E. Marvin, clerk. Exhibited on trial in the circuit court. Attest: E. E. Marvin, clerk.

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Office Supreme Court U. S.
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JAMES H. KENNEY,
CLERK.

Supreme Court of the United States.

No. 224. OCTOBER TERM, 1884.

THE BEECHER MANUF'G CO., *Appellant,*

vs.

THE ATWATER MANUFACTURING CO.,
J. B. SAVAGE and R. R. MILLER.

BRIEF FOR APPELLANT.

O. H. PLATT,
H. T. FENTON,
Counsel for Appellant.

PHILADELPHIA:
DUNLAP & CLARKE, PRINTERS, HASTINGS' BUILDING, 819-21 Filbert Street.
1884.

Supreme Court of the United States.

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SUPREME COURT OF THE UNITED STATES

THE BEECHER MANUFACTURING COMPANY, *Appellant,* *vs.*	Oct. Term, 1884.
THE ATWATER MANUFACTURING COMPANY, JULIUS B. SAVAGE AND ROBERT R. MILLER, *Appellees.*	No. 224.

STATEMENT OF THE CASE.

This is an appeal from a decree of the Circuit Court of the United States for the District of Connecticut, by the Beecher Manufacturing Company, against whom a decree in equity for the payment of $2,100.64, and costs, and awarding a perpetual injunction, has been entered, at the suit of the appellees.

The Bill of Complaint charges the corporation defendant with infringement of reissued Letters Patent of the United States granted to the complainants as assignees of Robert R. Miller, No. 8694, dated May 6, 1879, for "Improvement in series of dies for forming the heads of king bolts." The Bill further contains the usual averment of the making of the alleged invention by the patentee, the grant of the original patent on February 22, 1870, its assignment to the plaintiffs, and its subsequent surrender and reissue to them as assignees.

The Answer of the defendant, admitting that it has, for several years last past, made and sold king bolts, and made and used dies for the manufacture thereof, denies infringement of the plaintiffs' asserted exclusive rights under the said reissued Letters Patent, and sets forth several defences, among others the following, which, it is urged, are fully sustained by the proofs in the cause, and are presented for the consideration of the Court:

1. That the dies made and used by the defendants are substantially different in every material respect, as respects the part or improvement patented, from the dies described and claimed in the reissued Letters Patent, and the differences are set forth in general terms in the Answer.

2. That the original and reissued Letters Patent (read in connection with the history of the art) do not disclose or describe any patentable subject matter of invention embraced within the Acts of Congress relating thereto.

3. That the reissued Letters Patent describe and claim an alleged invention that is distinct from and dissimilar to, and not the same as the alleged invention described and claimed in the original patent, and that new matter was interpolated into said reissued patent in contravention of law, which new matter embraced certain important and substantial changes and alterations which had become known and used by the public, and which were extensively used as public property, and did not belong to or have any part in the alleged invention of said Robert R. Miller, and which were in express terms disclaimed in said original Letters Patent.

4. Want of novelty with the patentee Miller, of the devices, or combinations thereof, claimed in either the original or the reissued Letters Patent.

SUBJECT MATTER OF THE PATENT.

Long prior to the date of Miller's alleged invention, clip king bolts for carriages were a well-known and standard article of manufacture. They were then, and still are, of two general shapes, with several varieties of each; and the two classes were then, and are now, known, the one as flanged bolts and the other as plain bolts. The latter is represented on page 21 of Exhibit 12 (H. D. Smith & Co.'s trade catalogue, published in 1868; see Appendix to Record, page 14), and in Exhibit 10, being the bolt made by the appellant. The former is represented in Fig. 6 of plaintiffs' original patent, Fig. 4 of the reissued patent, and in Exhibit 11, being a bolt made by J. B. Savage, one of the appellees, and is described, and the purpose and objects of its flanges or wings fully explained in Exhibit 15, being Letters Patent granted to James Phelps, dated November 13, 1866, for a king bolt provided with wings or flanges (Record, page 70; and Appendix, page 13). Several samples of plain clip king bolts made in the years 1859 and 1863, as also the dies in which they were formed, were offered in evidence, and marked Exhibits 6, 7, and 8. Bolts like that made by appellant (Exhibit 10) were made by H. D. Smith & Co. from 1865 to 1869, and since then, and were from the earliest date mentioned, manufactured by that firm by means of dies (see testimony of W. W. Knowles, Record, page 56; and testimony of William B. McElney, page 49). The first operation in making the bolt, as practiced by all these parties, was to take a short rod of iron and split it a sufficient distance to form the clips; this was the method pursued by Wilcox, in his early manufacture (see testimony of George E. Wilcox, Record, page 37); also by H. D. Smith & Co. (see McElney's

testimony, page 49); also by the appellants, who produce a sample, Exhibit 9; also adopted by the patentee Miller, and mentioned in his original and reissued patents; and shown also in Morse's patent, of October 26, 1869, defendants' Exhibit 5.

It appears from the evidence in the cause, that the dies in question perform but two of the five operations in forming a clip king bolt; to wit, forming and bending. The split blank, after having its ends turned down or flattened out at right angles with the shank or stem, is placed (1) in forming dies, to give shape to the clip arms (and in the plaintiffs' dies to also form flanges or wings); it is then (2) placed in trimming dies, to relieve it of its fins; afterwards (3) in bending dies, to complete the formation of the clip arms and wings; (4) dies to form the collar; and lastly (5), in dies for drawing out the stem or spindle.

It was established by the evidence in the cause concerning the purpose and object of the forming and bending dies, and by the ocular evidence of the things themselves, that they are really duplicates, in the sense that the latter (which is not claimed separately by the patentees) really does over a second time the work done by the former (which is assumed in the reissue, though not in the original patent, to be claimed separately); in other words, that if the split blank was subjected first to the bending dies, the clip arms and wings would be equally as well formed, and necessarily of the same shape, as though the forming dies had been first used for that purpose, and so dispense with the *forming* dies by striking the blank twice in the *bending* dies. This is not mere theory of counsel, but is established by evidence of the use of the bending dies for both purposes, or rather the same purpose twice repeated, by Wilcox & Co., at the Portchester factory, from 1859 to 1868, with the

dies Exhibits 7 and 8. (See testimony: Record, pages 34, 35, 39, 41), and by other proof hereafter referred to.

The interchangeability, above referred to, of the bending die for the forming die in the first operation of shaping the clip arms, is also recognized in the patent to F. B. Morse, of October 26, 1869, Defendants' Exhibit 5, wherein the patentee says (see Appendix to Record, page 12):

"*By preference, I employ the opening* (or forming) *dies,* "*shown in Figures 1 and 2; yet it will be evident that the* "*dies in Figures 3 and 4* (bending dies) *may be employed as* "*the opening die, and thus dispense with the opening die.*"

This being the state of the art at that time, the patentees, R. R. Miller and F. B. Morse, both of whom were at the same time in the employ of H. D. Smith & Co., who had been making king bolts by means of dies for several years previously, made what they each considered improvements in the dies, and both applied for patents. The Morse patent is in evidence in the cause, and shows in Figures 1 and 2 a pair of opening dies precisely similar in every respect to Miller's forming or opening dies, with two exceptions, viz: that the clip arms are not to be bent in it quite flat (which is of no importance, as the arms are afterwards bent to a smaller angle), and that it has no grooves or recesses to form wings or flanges, though it has the transverse groove the full width of the die and the transverse projection on the upper die, in both respects precisely similar to the appellants' opening die. A second pair of forming dies, a pair of trimming dies, and finally a pair of bending dies, are fully shown in this patent. It is therefore not surprising that after the Patent Office ordered an interference between Morse and Miller, when the latter filed his application for the original patent on which the

reissue in suit is founded, Miller deemed it expedient, after careful and deliberate consideration from October 9, 1869, to February 5, 1870, to avoid further conflict with Morse, by filing, as he did, on the last-mentioned date, certain amendments of his specification, found on pages 61 and 62 of Record. These amendments changed the character of the invention claimed; for instead of claiming the dies separately, he amended by inserting the words "series of," thus claiming them only in combination, and by further adding an express disclaimer in the words, "I wish it to be understood that I do "not claim either of the dies herein described separately," so that the claim as finally allowed, reads "the *series of* dies A, B, and C, for forming "the clip arms and WINGS of the lower "ends of king bolts," etc. It may be that the Patent Office thought that this extremely limited claim was allowable on the ground that the prior devices did not contain the ring-like cavities to form the wings or flanges found in Miller's forming and bending dies, which is the only novel feature in it distinguishing it from prior devices, and as form is here of the essence of the invention that this constituted a novel and patentable difference.

The original patent thus contained the single claim quoted above, and there can be no pretence that the dies used by appellant which had no ring-like cavities, and differed in other respects, would have infringed this claim. But the patent having passed into the hands of the appellees, an application was filed by them for a reissue, more than nine years after the grant of the original patent, and this application is so broad and sweeping in its terms as to cover the bolt itself, had it been allowed as filed. It was amended, however, to confine it to the dies only. The entire specification of the reissue was

remodeled and rewritten, and so changed in its descriptive parts as scarcely to be recognizable as having any reference to the original, and it concludes with two claims. Attention is here called to the two specifications, printed in the appendix, and to the drawings of both patents, the reissue showing an additional die (forming an element of the first claim of the reissue), not contained in the original drawings nor even referred to in that specification.

THE ISSUE.

Upon this Reissued Patent, containing these two claims, the issue of infringement was made. These claims are as follows:

I. The die B b b′ and the die C, constructed and combined substantially as and for the purpose shown.

II. The series of dies B, C, D, and E for forming clip king bolts substantially as shown and described.

The proof of infringement offered by the appellees established the use by appellant of the forming dies shown in Exhibit 13 (Record page 71), and were conflicting as to the character of bending dies; the appellees witnesses contending that appellant used other dies for that purpose than those shown in Exhibit I (see Record, page 70); but it was not true in fact, and the weight of the evidence was against the proposition: but, however that may be, there was no pretence whatever that appellants' dies, either for forming or bending the blank, had any wing-like cavities to form wings or flanges, or, indeed, that the appellants ever made any flanged bolts.

Under the issue of novelty, Morse's Patent of 1869 was offered in evidence, and testimony of prior use by Wilcox and others. An additional issue was raised by the pleadings and proofs that neither of the claims covered patentable combina-

tions, but were for mere aggregations, the pairs of dies not co-acting with each other, nor ever being operated in sequence. And, lastly, a distinct issue was presented as to the validity of the Reissued Patent. It was averred to contain new matter; that it omits all qualifying and limiting clauses found in the original patent; that it contains sub-divided and expanded claims not warranted by anything found in the original patent; and, in brief, that it is substantially for a different invention from that for which the original patent was granted.

Proofs were taken under all these issues, consisting, *inter alia*, of the patent to Morse, testimony of witnesses as to prior use, expert testimony, the original Miller Patent, and the file and contents in the application for both the original and Reissued Patents to Miller, under which the appellees claim.

INTERLOCUTORY AND FINAL DECREES.

The case having been heard in the pleadings and proofs, an interlocutory decree was entered in favor of the complainants, sustaining the second claim of the Reissued Patent, conditioned upon the plaintiffs previously filing a disclaimer of the first claim, and finding the fact of infringement against the defendant. Thereupon a perpetual injunction was awarded as respects the matter of said second claim of the patent, and the cause referred to a Master to take an account of profits and damages. (For decree, see page 96 of Record, and the opinion on which it was based, on page 94.)

It is not surprising that the Court felt itself obliged to hold the first claim to be void, in view of the attempt to claim thereby the very matter which had been disclaimed in express terms in the original patent, and before the issue thereof, on the dissolution of the interference with Morse. But it is sur-

prising that the Court should have sustained the second claim, or, rather, given it the broad construction asked by the appellees, for had it been construed to cover the series of dies shown in the drawings of the original patent, and described in the specification thereof, as it should have been, it would be limited to a series of dies with ring-like cavities, and otherwise formed and shaped, as therein shown, for making *flanged* king bolts, and, as so construed, ought not to include, and would not properly include appellants' dies, which were differently constructed in many substantial and material respects, and used to produce a different product. Apart from these objections to it, the appellees, had they otherwise the right to a reissue, had lost it by gross laches, more than nine years having elapsed before the reissue was applied for, and the appellants having had their dies in use for at least five or six years prior to suit brought, which was instituted three months after the Reissued Patent was issued. It is, perhaps, proper and just to the District Judge, who decided the case, to say that the decisions in Miller *vs.* Brass Company and James *vs.* Campbell had not been reported when the opinion and decree in this case was pronounced.

The cause having been referred to a Master, proofs were taken, and his report filed, awarding to the plaintiffs $2,100.64, as the profits alleged to have been made by appellants from the use of the dies in question, based upon an alleged saving or gain in the cost of manufacturing bolts thereon, as compared with the cost of making such bolts by hand. Exceptions were taken to this report, which were overruled by the Court, and a final decree entered. (For opinion and decree, see Record, pages 143 and 144.)

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Ninth. The Court below erred in not decreeing the reissued patent to be void on its face, because the opening clause of the specification thereof contains an express admission that the sole object of such reissue was to re-describe the alleged invention and enlarge the claim of the original patent; the patentees were legally estopped from setting up any right to such a reissue after nine years acquiescence in the original claim, more especially as adverse rights had, in the meanwhile, accrued to the appellants, who had been using the alleged infringing dies for more than five years continuously prior to application for such reissue.

Tenth. The Court below erred in sustaining the Master's report, and overruling appellant's exceptions thereto, because the appelees claimed profits, not damages, and, in the absence of actual profit, the Master awarded a certain sum, based upon the difference in cost of making such bolts by the patented dies over making them *by hand*, wholly ignoring the uncontradicted testimony in the case that the bending dies of the patent (which are not claimed separately and are public property), if used twice upon the bolt blank, in two heats, would produce the same result as the pair of forming dies and the pair of bending dies used successively or in series.

Eleventh. The Court below erred in sustaining the Master's report, and overruling appellant's 4th exception thereto, which was as follows:

'The Master erred in charging the defendant with the whole difference in cost between forming and bending the bolt by hand and forming and bending on plaintiff's series of dies; and almost in the same sentence finds that one of the dies forming the series, and to which die the whole saving is due, is patented to Morse by a patent dated February 22, 1870.'

Under such a ruling the defendant would be compelled to account twice: first to the plaintiff, and afterwards to Morse, for the same saving.

Twelfth. The Court below erred in sustaining the Master's report, and overruling appellant's 11th exception thereto, which was as follows:

"The Master erred in reporting more than nominal damages against the defendant, because the evidence established the fact that nothing was saved or gained by the use of the dies as a series, but that the bending die, figure 6, of the plaintiff's patent, could alone have been used to perform the whole work of forming and bending the bolt performed by the series of dies patented by the plaintiff."

Thirteenth. The Court below erred in sustaining the Master's report, and overruling appellant's 12th exception thereto, which was as follows:

"The Master erred in reporting as follows: 'It is a matter of some doubt whether, of two dies patented to the complainant, to be used in a particular series for making a particular article, either of them can be adopted as the most valuable part of another series for making the same article, without infringement of said complainant's rights. But while it may be possible that such a claim may be sound as to the Miller Patent, said Miller having disclaimed both his opening and forming, and his bending die, when used alone, I find with regard to either of these partial steps, as I have already found in regard to them as a series, taken together, that they were covered by the Morse Patent of February 22, 1870, and were, consequently, not open to the public.' Under such a ruling the profits belong to Morse, not to the plaintiff."

Fourteenth. The Court below erred in sustaining the Master's report, and overruling appellants 13th exception thereto, which was as follows:

"The Master erred in reporting as follows: I find that the defendant's clamp die No. 1. when used either to form or bend the arms of clip king bolts, or to do both steps in one act, is undoubtedly used in infringement of the Morse Patent o February 22, 1870, if not that of Miller, and was, therefore, not available to it for such purpose."

Fifteenth. The Court below erred in sustaining the Master's report, and overruling appellant's 5th exception thereto, which was as follows:

"The Master erred in finding and reporting that the bending die alone, as described and shown in the plaintiff's patent at figure 6, is covered by the Morse Patent, and therefore not free to be used by the defendant and the public."

Sixteenth. The Court below erred in sustaining the Master's report, and overruling appellant's 8th exception thereto, which was as follows:

"The Master erred in not reporting that the defendants were at liberty to use the clamp dies, Exhibit No. 1, as described in the testimony; and that the evidence was overwhelming and uncontradicted that said dies alone will both bend and form the bolt, performing the work done by both the plaintiff's dies as cheaply and with as good results as the plaintiff's dies."

Seventeenth. The Court below erred in sustaining the Master's report, and overruling appellant's 9th exception thereto, which was as follows:

"The Master erred in comparing the daily product of the plaintiff's dies, operated by machinery, with the Wilcox dies, operated in a foot vise, and making up an account accordingly on the basis of an increased daily product, wholly ignoring the uncontradicted evidence in the cause, that the Wilcox dies, if operated by machinery, as were the plaintiff's, would produce as large a daily product."

POINTS OF ARGUMENT.

1. The State of the Art, and herein of the novelty and patentability of Miller's alleged invention.

If the evidence in the cause did not establish the fact, the expressed and implied admissions in the patent are sufficient, that the dies separately are old, the only novelty alleged consisting in their combination. That this is not a patentable combination, but a mere juxtaposition of elements. and not a vital union, must be evident after a reading of the proofs and an examination of the dies. The first is a forming die; the product of it is a blank with fins or ragged edges; this blank *must* be put into a trimming die and relieved of its fins before it can be inserted into the bending dies, where it is there finally shaped. It is quite clear that there exists no *combination* between the forming dies and the bending dies, they are simply used in series; indeed, there is an intermediate die, not claimed. The dies may be used a hundred miles apart, or at different periods of time; or two of the former may be used with one of the latter, or *vice versa*. The utility of both is only the separate utility of each. There is no action in concert to produce a result by their united action, but a mere assembling of two old devices. The separate function of each remains the

same, and is not controlled by the other when placed together. That this does not involve invention is too well settled to be disputed. Rubber Tip Pencil Company *vs.* Howard, 20 Wallace, 498; Reckendorfer *vs.* Faber, 92 U. S. 347. In the latter case the rule is stated thus: the combination to be patentable must produce a different force, effect, or result in the *combined* forces or processes from that given by their *separate* parts. There must be a new result produced by their *union*, otherwise it is only an aggregation of separate elements. Applying that rule here, the plaintiff's patent must be held invalid. Each die has its own effect, not aided in any manner by the action of the other. There is no *combined* action; each performs its own function, unaided and unaffected by the other. The product is simply a mere aggregate of several results, each the complete product of several elements, and does not therefore involve patentability. Hailes *vs.* Van Wormer, 20 Wallace, 353.

Indeed, it is quite evident, from an examination of the dies themselves, the patent, and the proofs in the cause, that in so far as the work done by the first die is concerned, the dies are interchangeable; in other words, that the forming die may be dispensed with entirely, and the bending die used to perform both operations at two successive heats. But if this was not so, there is no patentable combination in placing two dies, both old and well known, in a certain series or sequence, and permitting each to work out its own separate result. Each of these dies operates only in the old and well known way. Beyond the separate and well known results produced by them severally, neither contributes to the combined result any new feature; neither adds to the combination anything more than its separate independent effect; neither gives any additional

efficiency to the other, or changes in any way the mode or result of its action. As was said by the Court in Pickering *vs.* McCullough, 104 U. S. 319: "In a patentable combination of old elements all the constituents must so enter into it that each qualifies the other. It must form a new machine of a distinct character and function, or produce a result due to the joint and co-operating action of all the elements, and which is not the mere adding together of separate contributions; otherwise it is only a mechanical juxtaposition, and not a vital union." The present alleged invention presents no such patentable features. Besides which, it may be seriously doubted if a patent for invention can be lawfully granted for a die, or set of dies, for forming metal shapes where the only novelty consists in the peculiarity of its recesses and grooves; dies, generically, being old and the product being old. Clip king bolts, to be produced by appellees' dies, were old and well known; and the matrix of the die is simply the counterpart of the old product. A wax impression of it is sufficient to enable the ordinary die sinker to make the thing shown in the patent. If, on the other hand, the making of such a die does involve invention, then shape and form are of the essence of the thing patented; and any variation which produces a substantially different product is a different thing from the patented device.

A comparison of Morse's Patent with that of the appellees, and the file and contents in the applications for each, cannot fail to convince that the Patent Office intendend to give Miller a patent specifically for dies to make king bolts, with wings or flanges, and having grooves and recesses for that purpose. (See amendments to Miller's specifications, Record, page 61.) If it can possibly be sustained as claiming a patentable combi-

nation, it must be construed to be for that specific construction, otherwise it would fall for want of novelty, in view of the evidence of prior use exhibited in the record.

2. The Original and the Reissued Patents, and a Comparison of one with the other.

The original patent was granted to the plaintiff, Miller, February 22, 1870, upon an application filed July 31, 1869; it purports and is declared to be for an *improvement* in king bolt dies; it is stated in the body of the specification, in the argument filed in the Patent Office, and in the amendment of the original specification, to be for a "set" or "series of" dies, and the patent is entitled as for an "improved *series* of dies for forming the *heads* of king bolts;" the word "heads" being explained in the body of the specification to mean "the clip arms and wings" of the bolt. Three dies constitute the series; A being the forming die, B the bending die, and C the plunger or male die to accompany die B. The claim is for "*the series of dies A, B, and C, for forming the clip arms "and wings of king bolts for wagons, said dies being con-"structed and operating substantially as herein shown and "described.*" It will be observed from what has been said descriptive of the manufacture of king bolts, that these dies A, B, and C perform but two of the five operations of making the bolt; they simply bend and form the bolt, the other operations being the trimming-off fins, turning the collar, and drawing out the stem, each of which three last-mentioned operations are performed by dies which are not described in either of the patents, and have no connection with the plaintiffs' alleged invention, and not pretended to have. A further examination into the purposes and object of the dies A, B,

and C discloses the fact that the first or forming die A, which is to be used in connection with "a drop" or hammer, is a plain metal block with (1) "a round hole, a^1, in its centre; (2) two "semi-cylindrical grooves a^2," extending across the block from opposite sides of the central hole; (3) two ring-like cavities a^3," on each side of the central hole at right angles with the two transverse grooves. The rod of metal from which the king bolt is formed is directed first to be split as in Fig. 1, and the split parts then turned down to about at right angles with the body, which was the old, well-known and usual mode of preparing the metal bar for the dies. The blank thus prepared "is then placed in the die A, "and struck with a drop, forming the clip arms, and forcing "the surplus metal into the ring-like cavity a^3 of the die A, "around the hole a^1." * * * "The wings or lips are formed," etc., * * * "*their size being limited by the* "*capacity of the ring-like cavities* a^3." * * * "The par-"tially formed bolt is then removed from the die A." It will be observed from this description of the operation, that each and every of the three elements or features of the die A, viz.: the central hole, the semi-cylindrical grooves, and the ring-like cavities, are absolutely necessary and esssential to form the resultant bolt; the first to receive the stem or spindle, the second to form the semi-cylindrical clip arms, and the third to shape and limit the size of the wings or lips. It has already been clearly shown that the object of the plaintiffs' dies was to form a flanged bolt, and not a plain bolt without flanges or wings; if any additional evidence of this, beyond the drawings, Fig. 6, and the description in the body of the specification, is needed, it is to be found in the file and contents in the matter of the application for the original patent,

offered in evidence and found on page 61 of Record, from which it appears that on objection made by the Patent Office that the model, drawings, and specifications did not show and clearly describe the wings or flanges, and the mode of their formation, the patentee amended by filing as an additional model, a flanged king bolt, and by filing also an additional drawing, Fig. 6, sheet 2, being a drawing of the flanged bolt, and amending the specification by inserting a full description of the operation of the dies A and B in forming the wings or flanges.

The first or forming die A with its three essential features, as described and pointed out above, constituted the first of "the series of dies A, B, and C," and formed one of the elements of the combination, or series of dies, claimed in the single claim of the original patent; not claimed either in the specification or in the proofs in the cause to be novel in itself, but admittedly old and expressly disclaimed, except in combination with the dies B and C forming the series. See disclaimer, Record pages 60 and 62.

This forming die is fully, clearly, and accurately described, and its functions explained in the specification of the original patent, and properly claimed therein as an element of the combination, if the latter was novel with the patentees. But in the reissue, specification, filed ten years afterwards, it is altered almost beyond recognition, and claimed as an element of a minor combination, or, it may be truthfully said, claimed by itself (for the plain-faced upper die; without grooves, projections, or shape, is nothing but a hammer); and with one of its essential features, viz.: the ring-like cavities, eliminated. In brief, the first claim of the reissue claims it separately as a metal block having a transverse groove intersecting

a central hole; and as thus claimed, one of two conclusions is sure to follow, either the reissue is invalid, or it is void for want of novelty. The language of the first claim of the reissue is as follows: The die B, b, b^1, and the die "C, constructed and combined substantially as and for the "purpose shown." Figures 2, 3, 5, 6, and 7 of the drawings attached to the reissued patent are entirely new, and Fig. 5 is wholly unwarranted by anything that appears in the original patent or the file and contents of the application therefor. In the reissue the die A of the original patent is called die B; the "round hole a^1 in its centre," of the original patent is called the "vertical central opening b that corresponds in general shape and diameter with the body of the blank;" the "ring-like cavities a^3" of the original patent are described as follows: "At the upper end of said "recess b, the corners are rounded;" and the "semi-cylindrical grooves a^2, extending outward from opposite sides of the central hole" of the original patent, are called "a half-round groove b^1, which intersects the opening or recess b, and has a slightly greater depth at its ends than at its longitudinal centre, and a slightly greater width at the latter point than at its ends"; and finally the "drop" of the orginal patent, which is not shown in the drawings nor described in the specifications thereof, nor even referred to therein more than once, and then only by the single word "drop" in the sentence "struck with a drop," becomes in the reissue "the plane-faced upper die C;" is shown in the new Fig. (5) of the drawings, and is finally made use of to form an element of a minor combination with the forming die (A of the original, and B of the reissue) as a separate and distinct novel feature. If this is not "new matter," it is difficult to understand the meaning of, or to give any effect to, those words in the Act of

Congress prohibiting interpolations of that character into amended specifications of reissued patents.

Again, the language of the original patent, that "my in-"vention has for its object to furnish an improved set of dies, "by means of which the clip arms and wings of king bolts "may be quickly, conveniently, and accurately formed," is changed in the reissue to read: "The design of my invention "is to enable clip king bolts to be easily and cheaply made "by machinery." If there is any peculiar virtue in operating the patented dies by machinery over working them by hand, as seemed to be the view of counsel for appellees during the taking of proofs, then this change of language in the reissue is wholly unwarranted by anything in the original patent; but such position can scarcely be considered tenable, in view of the fact that the dies are the same whether operated by hand or by machinery, and there is no evidence in the cause on which to base such an argument.

The remarks of this Court in Swain Turbine Company *vs.* Ladd 102, U. S. 408, are very applicable here. There, as here, there was no attempt to assert that the dies which were in use by appellants, and had been continuously so used by them for more than five years prior to suit brought, were within the meaning and claim of the original patent; and in consequence thereof rival manufacturers (who had obtained possession of the patent) sought to secure a monopoly of the trade; reissued the patent, with amended description, additional drawings, and expanded claims, and within three months thereafter entered suit against these appellants. Such reissue having been applied for with the manifest intention of obtaining a patent embracing a wide monopoly of structure, and to drive their competitors out of the business of making king bolts.

That this was the object of the appellees is evident from an examination of the file and contents of the application for the reissue, wherein is attempted to be claimed not only the entire combination or series of dies as originally patented, but the opening and the bending dies separately from each other, and lastly, the split blank from which the bolt is made. This was so outrageous an attempt to abuse the privilege of reissue, that on objection by the Patent Office, the claims for the split blank, and the bending dies separately, were immediately withdrawn, and the reissue granted for the series of dies, and for the opening dies separately, which latter, as thus claimed, formed no part of the invention, was expressly disclaimed in the original patent, and ought never to have been allowed. The Court below, without hesitation, declared the first claim of this patent to be void, in view of the disclaimer in the original; but it should have gone further and held the second, which claimed a combination of which the subject matter of the first was an element, to be equally void; for as this claim was construed by the Court, it was not confined to dies having recesses to form wings or flanges, which is the distinguishing feature of the dies of the original patent.

The extent to which a patentee may avail himself of the privilege of surrender and reissue, is thus stated in a very recent decision of this Court: "The specification may be amended so as to make it more clear and distinct. The claim may be modified so as to make it more conformable to the exact rights of the patentee, but the invention must be the same.' So particular is the law upon this subject, that it is declared that 'no new matter shall be introduced into the specification.' This prohibition is general, relating to all patents; and by 'new matter,' we suppose to be meant new substantive

matter, such as would have the effect of changing the invention, or of introducing what might be the subject of another application for a patent." Powder Company *vs.* Powder Works, 8 Otto, 138.

The only novel or patentable feature in a die for forming metal shapes is the peculiar configuration of its grooves, recesses, and projections; these are its distinguishing characteristics; form is of its very essence; indeed, it is the shape that is patented, and that only. Can it therefore be successfully contended that the "semi-cylindrical grooves" on opposite sides of a central hole, shown and described in the original patent, are the equivalant in such a device of "a "half-round groove * * * having a greater depth "at its ends than its longitudinal centre, and a greater width "at its centre than at its ends;" and that "the rounded cor-"ners" * * * of the centre hole are the same substantially as the two "ring-like cavities" shown and described in the original patent? It will be observed in this connection that the "ring-like cavities" are eliminated from the reissue; the "rounded corners" of the central hole not being the same, nor intended to mean the same. These words are deceptive, for if the diameter of the central opening be greater than the longitudinal center of the groove, the corners of the central opening must necessarily be round, without the addition of any ring-like cavities; but if the transverse groove at its longitudinal centre be wider than the diameter of the central opening, then the latter at its top is merged in the former, and there can be no round corners, nor any corners. If these differences be considered in the light of the evidence in the cause which goes to prove that the attempt of the patentee was to expand the claim in the reissue, and so reconstruct the lower

die by alteration of the shape of its recesses and grooves, that the resultant product would not be a bolt, such as would necessarily be produced by the die, as described in the original patent, but a bolt which would contain sufficient metal at the base of the clip arms to enable the operator to make, in the subsequent stages of the manufacture, a flanged bolt or a plain bolt at his pleasure. This was no part of the plaintiffs' invention, and the attempt to insert and claim it, in a reissue, by ingenious modifications and re-descriptions of the original device, and which was plainly the object of the reissue, as disclosed by the plaintiffs' proofs in rebuttal, is the very thing that is condemned in the recent decisions of the Supreme Court, and prohibited by the Act of Congress.

A careful examination of the original patent, discloses no sufficient or satisfactory ground for the subsequent surrender and reissue. There was no want of exactness in the description and claim, and the one corresponded with the other. There was no error from "inadvertence, accident or mistake."

Russell *vs.* Dodge, 93, U. S., is authority for the proposition, and is so cited in Klein *vs.* Russell, 19 Wall 43, that where the claim of a patent is valid, and the descriptive part of a specification sufficient to support it, the patent cannot lawfully be reissued.

After the making by the appellants of the improved opening or forming dies of the character shown in Exhibit 13, page 71, of Record, and the adoption of identically these devices by one of the appellees in his factory, the appellees surrendered the original patent of Miller, and obtain a reissue, with amended drawings and a specification so altered in the description and claims by ingenious alterations, erasures, and interpolations that under their construction of it as claimed in this cause, it

is sufficiently elastic and expanded that it may be conveniently used to suppress the manufacture and use by appellants of dies which are widely different from any ever contemplated by the patentee.

This practice of surrendering patents which are neither "inoperative or invalid," and the specifications of which are "neither defective or insufficient," and obtaining reissued patents therefor with new and enlarged claims, for the evident purpose of suppressing improvements in the same art, has grown to such an extent that a very large proportion of the reissued patents that have in the past few years come before the Supreme Court have of necessity been declared void. The following, of those cases, may be here appropriately referred to, as illustrating what the Court considered to be such an enlargement of the scope of the description and claim as brought the patents in question within the prohibitory clause of the statute forbidding the insertion of new matter, viz.:

Burr *vs.* Duryea, 1 Wallace, 573.
Carlton *vs.* Bokee, 17 Wallace, 463.
Seymour *vs.* Osborne, 11 Wallace, 516.
Gill *vs.* Wells, 22 Wallace, 1.
Robert *vs.* Royer, 91 U. S. 150.
Railway Company *vs.* Sayles, 97 U. S. 563.
Powder Company *vs.* Powder Works, 98 U. S. 138.
Leggett *vs.* Avery, 101 U. S. 256.
Ball *vs.* Langles, 102 U. S. 128
Swain Turbine Company *vs.* Ladd, 102 U. S. 408.
Moffit *vs.* Rogers, 106 U. S. 350.
Heald *vs.* Rice, 104 U. S. 737.
Matthews *vs.* Machine Company, 105 U. S. 354.
Bantz *vs.* Frantz, 105 U. S. 160.

Johnson *vs.* R. R. Co., 105 U. S. 537.
Clements *vs.* Odorless Ex. Co., 109 U. S. 641.
Turner & S. Co. *vs.* Dover Stamping Co., 111 U. S. 319.

In the case at bar we find the application for the original patent was amended by the filing of a model of a flanged bolt, a drawing of the new model, and of a detailed description of the operation of the dies in forming the *wings* or *flanges*. Six months later, after the application had been placed in interference with F. B. Morse (not the patent of October 26, 1869, but one granted February 22, 1870) the patentee, Miller, amended both his specification and claim, by adding the words "series of" before the word "dies" in both places, and inserting the following disclaimer before the claim: "I wish it to be understood that I do not claim either of the dies herein described separately;" the Interference is dissolved, and the case passed for issue the same day as the filing of the amendments. Also, on the same day with this patent, viz.: February 22, 1870, the patent, the claims of which were placed in Interference with this, issued to F. B. Morse.

Thus the patent was originally granted with a claim as broad as could possibly be allowed, and which fully covered all the invention shown and described in the description and drawings, and which was necessarily limited, and the limitation acquiesced in by the patentee, as evidenced by his amendments and his disclaimer, done after mature deliberation.

In view of this there can be no doubt of what Miller understood he had patented, and that both he and the Commissioner regarded the patent to be for a *series* of dies so shaped, recessed, and grooved that the product of the matrix of each would be the thing shown in Figure 6, of the drawings, viz.: a bolt with *wings* or *flanges*, not as a claim for the forming die

and the bending die, with or without "ring-like cavities," and of such shape otherwise that their product would be either a flanged bolt or a plain bolt, accordingly as the blank was manipulated in an intermediate set of trimming dies.

But apart from the objection to the reissued patent that it contains new matter, it is otherwise void on its face. Its opening clause is an express admission that the object of the reissue is to *enlarge* the claim, and its date shows an acquiescence for over nine years in the claim of the original. This gross laches, apparent on the face of the document itself, must alone avoid it under the recent decisions of this Court.

Miller *vs.* Brass Co., 104 U. S., 350.

Especially where, as here, intervening interests have arisen in the meantime; the appellants having had their dies in use for over five years before suit was brought.

James *vs.* Campbell, 104 U. S., 356.

There can be no doubt that both the first and second claims of the re-issued patent, read in connection with the amended description, and as construed by the Court below, are both of them broader than the claim of the original patent; and that the appellant's dies would not be within the scope and meaning of the original specification or its single claim. Indeed, it is not denied that the appellees intended, by the surrender and re-issue, to cover just such dies as those in use by appellants, and such purpose is evident from the language of the amended specification. If the Court is satisfied of this the re-issue must fall.

Wood Paper Patent, 23 Wallace, 566.

Johnson *vs.* R. R. Co., 105 U. S., 539.

Moffit *vs.* Rodgers, 106 U. S., 423.

It will, perhaps, be argued by the appellees that, comparing the original claim with the second claim of the reissue, they are for the same thing, and therefore that the latter is not to be avoided. Apparently they are, but only apparently, for they both refer back to the body of the specification, in which the dies are *described* very differently in the reissue from what they are in the original. The original claim reads: "The series of dies A, B, and C, for forming the clip arms *and wings* of the lower ends of king bolts for wagons, said dies being constructed and operating substantially as herein shown and described;" and their descriptive parts of the specification, to which the claim refers back as to how the dies are constructed and operate, contains a detailed description of the ring-like cavities, to form the wings or flanges, and how the dies operate on the metal blank to form these parts; and this description is equally full for both the forming and the bending dies.

In the reissued patent, the second claim (the one sustained by the Circuit Court) reads: "The series of dies, B, C, D, and E, for forming clip king bolts, substantially as shown and described;" omitting the words "clip arms and wings;" and these dies are shown and described in the descriptive parts of this specification, very differently, indeed, from what they are in the original specification. The opening dies, B and C, are described in wholly different language, that applicable to C being ambiguous and capable of a double meaning, and so construed by appellees' expert to mean appellant's die No. 13, which by actual inspection is shown to be different, and was never in the contemplation of the patentee when he took the original patent; *and the other die, B, not being either shown or described in the original, and having no existence prior to*

the reissue. And so also with the other elements of the claim, the bending dies D E; they are described as having recesses and grooves, which cause "the *surplus* metal, at the point where said arms go in said body, to be thrown out and form wings or lips." A fair and just criticism on this language is that instead of being a more clear and accurate description of the dies, it is ambiguous and intended to be so inserted for the very purpose for which it was afterwards made use of, viz., that a die which had no such recesses, and did not *necessarily* form a *flanged* bolt, but would throw out a flat fin between the *surfaces* of the dies, which fin could be trimmed and shaped in an intermediate trimming die, to form such flanges, would be within this description. The language of the original patent describing this die (Record, page 60, folio 111), is full, clear, and unequivocal, and it is respectfully contended, upon authority, that a false and ambiguous description of it, by which the reissue claim may be given a broader construction than that warranted by a clear, truthful, and an ambiguous description, is new matter within the meaning of the statute. The conclusion is inevitable, that the second claim of the reissue is enlarged, if it means, or is capable of being construed to mean, a set of dies which will form at pleasure a plain or a flanged bolt, according as the blank is manipulated in an intermediate set of trimming dies, as testified by Earle, appellees' expert, for so interpreted it is not for "the series of dies, A, B, and C, for forming the clip arms *and wings*," etc., claimed in the original patent.

See McMurray *vs.* Mallory, 111 U. S. 97, on the effect of change of form, in which the original patent claimed a soldering-iron of a form whereby certain specified functions were performed; the reissue covered every other form of the tool,

whether adapted to perform those specified functions or not; this Court held that such a change constituted an enlargement of the claim which rendered the reissue *pro tanto* void.

3. THE DIFFERENCES BETWEEN THE DEVICES USED BY THE APPELLANT AND THOSE DESCRIBED AND CLAIMED IN APPELLEES' PATENT, AS RESPECTS THE QUESTION OF INFRINGEMENT.

The reissued patent was, first, for the minor combination of dies B and C; and second, for the series of dies B, C, D, and E. The first claim, for the minor combination, was erased from the patent by the disclaimer ordered by the Court below as a condition of its decree. We have, therefore, to do only with the question of infringement arising under the second claim. This includes, as an element of the combination, the subject matter of the first claim, and if the latter did not cover appellant's dies, it follows that the second, which is for the whole, and includes the lesser, certainly does not. It may not, therefore, be inappropriate here to demonstrate that the forming dies used by the appellants could not, even giving to the claim a broad and liberal construction, be held to come within its terms. The language of the claim is "the die B *b b*^{1} and the die C, constructed and combined substantially as and for the purpose shown." The product of these dies is shown in Fig. 2 of the reissued patent, and the wings or flanges produced by the "rounded corners" of the recess *b* are there clearly shown. No such is found in the appellant's dies. Each of these elements, of the peculiar form described, go to make up the combination claimed, and form alone is the thing patented.

It is a settled rule of law that where a patent is for a combination of known parts, it is not infringed by any num-

ber of parts less than the whole; for the patent in such case is for that identical combination, and a combination of any less number of parts in a different thing. Sharp *vs.* Tift, 2 Fed. Rep. 697. Gould *vs.* Reese, 15 Wall. 187. The case at bar is not brought within that class of combinations in which one or more of the elements are new, and so infringed by the appropriation of the part that it is new. There is no proof in the cause that any of the several elements of the combination or series of dies are novel with the patentee. And it is conclusively settled that where a patentee claims as his invention only the combination which he describes, the separate elements thereof are to be regarded as old, or common and public. Rich *vs.* Close, 4 Fish. 282. Rowell *vs.* Lindsay, 6 Fed. Rep. 291. In the Corn Planter Patent, 23 Wall. 224, it was held that "where a patentee, after de-"scribing a machine, claims as his invention a certain com-"bination of elements, or a certain device or part of the "machine, this is an implied declaration, as conclusive, so "far as that patent is concerned, as if it were expressed, that "the specific combination or thing claimed is the only part "which the patentee regards as new."

Nor can the plaintiffs successfully contend that the ring-like cavity a^3 around the central hole a^1 of the lower forming die (see Fig. 2 of original patent, and Fig. 5 *b* of reissue) is not an essential part of the device, but that the distinctive and essential feature of this part of the device is a block with a half-round groove b^1 (Fig. 5), extending across the block and intersecting a central opening "of the general shape" of the split rod or blank. Whether the lower forming die be provided with a ring-like cavity a^3 around the central hole a^1" (as stated in original patent), or "at the upper end of said recess *b* the

corners are rounded, as shown" (as it is described in the reissued patent), this was and is as much a part of the device covered by the first claim of the reissue as is the half-round transverse groove *b*; and equally a part of, and as important a part of, the combination; for its object and purpose was and is to form the lips, wings, or flanges, as shown by both patents. It will not do for the plaintiffs to contend that this ring-like cavity may be dispensed with, and by proper trimming of the fins, by trimming dies or otherwise, the lips, wings, or flanges may be formed in the bending dies alone, or may be dispensed with altogether, to form a plain bolt. The Court must look at the entire specification and claim in determining what the invention is. The combination is an entirety. Unless it is maintained as such the whole of the invention falls. If one of the elements is given up the thing claimed disappears. There is no novelty in making dies generally for forming metal shapes, nor in a flat-faced upper die, or drop, which is but the substantial equivalent of a hammer, having no grooves, indentations, or projections, and is used simply to strike the blank and force it into the grooves and recesses of the lower die; nor is there any novelty in making a king-bolt die with a round central hole or opening, nor in a die with a round central opening intersected by a transverse groove. The peculiar configuration or shape, in its entirety, is the thing patented. Form is here the essence of the invention. The central hole or opening of the forming die, with its ring-like cavity or rounded corners (to form therein the wings or lips, as shown in Fig. 2 of reissue), is a part expressly claimed in the original patent, and in the first claim of the reissue as an element of the first or minor combination, and

"Where a patentee, suing for an infringement, declares upon "a combination of elements which he asserts constitutes the "novelty af his invention, he cannot abandon a part of such "combination and maintain his claims as to the rest. Much "less can he prove any part of his combination immaterial or "useless." Rowell *vs.* Lindsay, *supra;* Vance *vs.* Campbell, 1 Black, 427.

"The different parts may perform more or less important "functions, but each and all are essential to make the thing "which the patentee has claimed as his invention." Rowell *vs.* Lindsay, *supra.*

"Our law requires the patentee to specify particularly what "he claims to be new, and if he claims a combination of cer- "tain elements or parts, we cannot declare that any one of "these elements is immaterial." Water Meter Company *vs.* Desper, 101 U. S. 337.

In view of the state of the art as shown, the plaintiffs cannot successfully contend that an upper die, provided with a rib or projection to accomplish a specific useful purpose, is the equivalent of the well-known flat-faced upper die or plunger, which is old and not the invention of Miller, and is described in the original patent in two words only, viz.: "a drop;" nor is the argument tenable, in view of the fact that an opening or forming die with a central opening and transverse grooves is old, that the second transverse groove or depression of defendants' lower forming die is the equivalent of Miller's ring-like cavities, or rounded corners; for the patent states that the latter are for the purpose of *forming* AND *limiting the size* of the *wings or flanges*, whereas the theory of the plaintiffs' case is that the defendants' second transverse grooves form irregular fins, which may be trimmed and shaped into

wings or flanges by and in a separate die called a flanged trimming die, or otherwise, which has no connection whatever with Miller's alleged invention, and is not claimed to have. Besides which the operation and result are wholly different, as testified by Jenks; Record, page 55. Ans. 16.

The rule as laid down in McCormick *vs.* Talbot, 20 Howard, 405, cited and affirmed in Burr *vs.* Duryea, 1 Wall. 573, is that:

"If the invention claimed be itself but an improvement in "a known machine by a mere change of form or combination "of parts, the patentee cannot treat another as an infringer, "who has improved the original machine by use of a different "form or combination, performing the same functions. The "inventor of the first improvement cannot invoke the doctrine "of equivalents to suppress all other improvements which are "not colorable invasions of the first."

But the defendants never made any *flanged* bolts, and never made use of any *flanged* trimming die to shape or form wings out of the fins left on the blank after it came from the forming die. The theory of the appellees, that a *plain* bolt may be made on Miller's die by simply cutting off the flanges in a trimming die, may or may not be true, but it is not relevant to this issue; and the contrary proposition, that a *flanged* bolt may be made in defendants' dies without the use of a saparate die specially designed to trim the fins into flanges, and the alteration of the bending dies by adding recesses wherein the flanges are to be pressed, is certainly not true, and is not established by any evidence in the cause, and it is of no importance if it were, as defendants never used any *flanged* trimming die, never altered their bending die to make a *flanged* bolt, and never made any *flanged* bolts.

The defendants' forming or opening dies (see illustration, page 71 of Record) not only do not contain the several elements of the minor combination covered by the first claim of the reissue, but differ therefrom in many essential particulars, viz: (1) The grooves in defendants' lower die are semi-cylindrical, and consequently form arms or clips that are semi-cylindrical, whereas the reissued patent describes the transverse groove as having "a slightly greater depth at its ends than at its longitudinal centre, and a slightly greater width at that point than at its ends," so that the product is by no means a bolt with *semi-cylindrical* clips or arms. (2) The defendants' lower die has no "ring-like cavities" or "rounded corners" into which the metal is pressed to "form wings or flanges" and "limit their size." The transverse groove is not their equivalent; these ring-like cavities not only form but limit the size of the flanges; and the testimony is uncontradicted that to attempt to open and form a blank for a *flanged* bolt on defendants' opening die, the fins would have to be made use of, and shape afterwards given to the blank on a separate die specially designed for the purpose, and called a *flanged* trimming die. See testimony of Earle, 309 and 331, X Int., pages 85 and 88 of Record; and Ellis 284 Int., page 80 of Record. (3) The defendants' upper die is not smooth-faced like C Fig. 5 of plaintiffs' reissue, which is really not a die, but merely a hammer; on the contrary, appellants use an upper die which is provided with a rib or projection corresponding to the transverse groove of the lower die, and which performs a specific useful function. See Atkins, Int. 142 and 143, page 24 Record; Earle X Int. 297, page 82 of Record; Ellis, Int. 287, page 80 of Record; Jenks, Int. 16, page 55 of Record.

The differences between the appellees' forming dies and those of appellant are thus described by the expert, Jenks (Record, page 55. Ques. and Ans. 16.): "Please look at the drawing, Exhibit 13 (appellant's forming dies), and state whether or not it is substantially different and intended to form an entirely different shape resultant bolt from the pair of dies shown in Fig. 5 of plaintiff's reissued patent."

Ans. It is entirely different in construction and design to produce an entirely different king bolt, as in the dies in Exhibit 13 there is a projection on the under side of the top, or falling die, and a corresponding depression in the bottom, or anvil die; this projection and corresponding depression, designed to thin the metal at the bottom, between the arms of the king bolt; whereas the Miller one gathers the metal into recess *b*, out of which, to form the wings or flanges, as heretofore described, causing, of necessity, an entirely different product."

And, again, another witness, Wilson W. Knowles, who has had fourteen years experience in making and using dies for clip king bolts, worked in the shops with both the patentees, Morse & Miller, testified (pages 56 and 57 of Record). Ques. 17. Please look at Fig. 5 of plaintiff's reissued patent and state whether or not the recess *b*, in the die Fig. 5, is or is not essential to the formation of the wings or flanges of the king bolt, defendants Exhibit No. 11."

Ans. 17. It is.

In the recent case of Werner *vs.* King, 96 U. S. 218, in which the plaintiff's patent was for a fluting machine, in which the improvement consisted solely of an arched guide to give a curved shape to the fabric as it was fed to the

rollers, Mr. Justice Miller, in delivering the opinion of the Supreme Court, said:

"Where form is of the essence of the invention, it is neces-
"sarily material; and, if the same object can be obtained by
"a machine different in form, where that form is inseparable
"from the successful operation of the instrument, there is no
"infringement. Winans *vs.* Denmead, 15 How. 330. In
"King's Patent, the result is wholly due to the guiding arch,
"through which the fabric is carried. It is this semicircular
"form which gives the redundancy of material necessary to
"the puff; and no guide which did not in some manner give
"the material an arched or curved shape as it passed into the
"flutting rollers, can be considered as a part of King's Patent.
"It is not only necessary to an infringement that the arrange-
"ment which infringes should perform the same service, or
"produce the same effect, but, as Mr. Justice Nelson said in
"Sickles *vs.* Borden (3 Blatch. 535), it must be done in sub-
"stantially the same way."

Appellant's forming dies, consisting of the lower or anvil die, with its two intersecting grooves; and upper die, with its ribbed projection, cannot therefore be an infringement of either claim of the reissued patent, and if possible to be brought within its terms, the reissue would be void as being for a different invention, and more than that for which the original patent was granted; for the main question of the case is whether the appellant's opening and bending dies infringe the patent originally granted to Miller, for his alleged invention; and if not, whether his assignees, by the use or abuse of the right to surrender and reissue the patent, can so expand it as to cover by *ex post facto* operation, all subsequent inventions.

The second, or bending die used by the apppellants (see illustration, page 70 of Record), is so entirely different in every respect from the appellee's bending die, Figure 5 of reissue, that it is scarcely necessary to discuss the differences; in any event, it is immaterial, for the appellee's expert, Earle, has admitted, page 87 of Record, X. Int. 332, that appellant's bending die is similar in shape of cavity to the old dies, Exhibit 8, used by Wilcox as early as 1863; and he was perfectly correct in his statement, as an inspection of Exhibit 8 will disclose. It is useless for the appellee to argue that because Wilcox operated Exhibit 8 by hand or in a foot vise, that it became a different tool when used in a steam press.

Although the evidence was overwhelming that appellants did not use any such bending die as shown in the reissued patent, and proved this conclusively by the witnesses Southwick and McElney, the Court on the unsupported testimony of two or three workmen, all in appellee's employ, held the contrary, though none of these witnesses could give an accurate or even tolerably clear description of what they saw in appellant's shops. The weakness of the *prima facie* case was apparent to the counsel, for he attempted by his expert, Earle, to prove that defendant's Exhibit No. 1 was like appellee's bending dies, thus practically abandoning his former position.

To this end Earle was called upon to say (Record, pages 83 and 84):

"Ques. 299. If such bending were practicable, would it make any difference, in respect to the bending, that the dies were made sectional instead of solid?

"Ans. No, sir; it would not; for the reason that when the bending is performed, the two parts of the die must be held

together, as if they were a single piece or solid die. The separation into two parts being only a convenience for setting the collar in its cavity; and when set therein, and the two parts closed, they are, so far as the operation is concerned, a solid die."

And he is quite right; but the conclusion to be drawn is fatal to the patent. For this is the die that he said (page 87, Ques. 233) is like the Wilcox die in shape of cavity; and this is the identical die which the Court, in the opinion on the Master's report, said was covered by the Morse patent; and it is the same die which everybody in the trade, even the appellees, have been using in addition, or supplementary to their bending dies, and which all these people, even the patentee Miller, admitted before the Master, to be old—as a clamping or finishing die, as some of the latter witnesses said. But if the thing itself was old, there was no novelty in applying it to an analogous use, to wit: bending. Even the Court fell into this error, as stated in the final opinion (Record, page 144).

But the appellees' counsel, besides attempting to prove by his witness Earle, as stated in Ques. 299, already quoted, also tried to prove the contrary proposition, that Exhibit 1 could not be used as a bending die, as the appellants asserted they used it; and his testimony (which no doubt the Court was erroneously guided by) is found on page 83 of Record, Ques. and Ans. 298. But the reasoning was fallacious; for the appellants clearly proved, by actually operating the die No. 1, in the presence of counsel and the Master, that it did form and bend the bolt, and that without the aid of any other previous or subsequent die; and this the Master was obliged to admit in his report, and even the Court also in the final opinion in the following words, page 143 of Record: "The die known as

No. 1 was not used as a bending die by the defendant before the injunction. On the contrary, it used the plaintiffs' patented series, *but since the injunction has probably used die No. 1.*" If the appellants could use No. 1 as a bending die *after* the injunction, they could as easily have used it *before*. This remark of the Court was wholly unnecessary, and was without any foundation whatever in the proofs.

But apart from this, Exhibit No. 1 did not have at any time, or for any purpose, any recesses to receive and complete the formation of wings or flanges. The answer of the appellees' expert to this is amusing, if not instructive. He says, in substance, that true it is that the patented dies were intended to make a flanged bolt, and they contain recesses for the purpose, but if you do not put in enough metal for the purpose, or if you use trimming dies to cut off the flanges or wings formed by the opening dies, then, of course, the recesses of the bending dies will have no work to perform, and the result will be a *plain* bolt. In brief, if you employ an intermediate pair of trimming dies shaped to undo part of the work of the forming die, the bending die will turn out a bolt like that made by appellants, and therefore he thinks they are alike. (See his answers to Ques. 307, page 85, and Ques. 318, 319, and 320, page 87, and Ques. 331, 332, and 333, pages 88, and 89, of Record.) In these answers the witness says (1) as to the *forming* dies: "The record and original patent, as also the quotation, which I made from the reissue, show that the wings, or lips, a^1, are shaped from the metal left in the blank at the point indicated by the forming dies;" and (2) as to the *bending* dies, "they (the recesses d^2) are necessary in the formation of a flanged bolt, and the description says that the surplus metal at that point is forced into these recesses," etc.

Lastly, the defendants' bolt, Exhibit 10, is so unlike plaintiff's bolt, Exhibit 11, that a comparison furnishes conclusive evidence that substantially the same shaped dies could not have been used in their formation.

4.—Errors in the Master's Report, and in the Opinion and Decree founded thereon.

The error underlying the theory on which the Master made up his report, is that he gave the appellees the whole gain or saving in making bolts upon the forming and bending dies of the patent, as compared with making dies by hand upon the Wilcox dies as used at Port Chester before the adoption of a drop or steam press to work such dies. This was entirely wrong, because not confining the award to such profit or saving only as was due to the part or improvement patented. That this is settled law does not admit of doubt in the multitude of decisions establishing it.

Mowry *vs.* Whitney, 14 Wallace, 620.
Schillenger *vs.* Gunther, 14 O. G., 713.

And the burden is on the plaintiff not only to show that the patented improvement gave additional value to what was old, but also the money value of that advantage.

Blake *vs.* Cemetery Co., 16 Fed. Rep., 676.
Littlefield *vs.* Perry, 21 Wall., 205.
Maier *vs.* Brown, 17 Fed. Rep., 736.
Cawood Patent, 94 U. S., 695.
Calkens *vs.* Bertrand, 8 Fed. Rep., 755.

The burden of proof is on the plaintiff to show profits by clear and convincing proof, otherwise he can recover nothing but nominal damages.

Root *vs.* Railway, 105 U. S., 202.

And even where he has shown actual profits or savings on the *whole* device, this is not sufficient, for the burden is on him to give evidence separating the profits which can be allowed from those which cannot be allowed:

Faulke *vs.* Kamp, 10 Fed. Rep, 675.

The only exception to the rule is where the patented part gave the whole value to the complete thing; and the burden is on the plaintiff to show this by affirmative proof; it is not to be presumed. Garretson *vs.* Clark, 111 U. S., 120. And in the absence of such proof nominal damages only can be awarded.

As was said by this Court in Black *vs.* Thorne 111 U. S., 124. "It does not always follow, that because a party may have made an improvement in a machine and obtained a patent for it, another using the improvement and infringing upon the patentee's rights, will be mulcted in more than nominal damages for the infringement. If other methods in common use produce the same results, with equal facility and cost, the use of the patented invention cannot add to the gains of the infringer, or impair the just rewards of the inventor. The inventor may indeed prohibit the use, or exact a license fee for it, and if such license fee has been generally paid, its amount may be taken as a criterion of damage to him when his rights are infringed. In the absence of such criterion, the damages must necessarily be nominal."

Applying these principles of law to the case at bar, the bare statement of the fact that the dies, separately, are not the patented thing is enough to overthrow the claim for the alleged saving due to both. The only true inquiry was what was saved by the use of one without the other as compared with the use of both. But it was proven beyond contradiction that the second, or bending, die really performed the whole work; that the forming die could be dispensed with; and that the bending die did over a second time what was done by the forming, or first die; and that if the blank was struck twice in the bending die in two successive heats, the same result would be obtained as by the use of both the forming and bending dies, used each once in succession. If this is so, and it is proved conclusively, there was no gain or saving arising from the alleged combination, and due and payable to the patentee, and the award should have been nominal only.

The proofs on the subject are as follows:

I. The matter of the eleventh exception to the Master's Report contained in the ninth and eleventh assignments of error:

It was so testified by Geo. E. Smith (Record, pages 106 to 111), and inferentially by Miller (Record, page 114. Ans. 11.)

II. The matter of the ninth exception to the Master's Report contained in the sixteenth assignment of error.

It was so proven by Geo. E. Wilcox. (Record, page 124. Ques. and Ans. 3 to 6; and no attempt was made to contradict him. His testimony was: "Ques. 3. Did or did not the die Exhibit 7, or the die Exhibit 8, perform both the opera-

tions performed by Exhibits, figures 5 and 6 of the plaintiff's patent, namely, of opening and of bending the blank.

Ans. They did. I understand by your question opening it, as shown in Exhibit B, and bending it, as shown in Exhibit A, and I answer yes.

Ques. 5. If you substitute either the die, Exhibit 7, or the die Exhibit 8, for and instead of both these dies, 5 and 6 of the plaintiff's patent, to perform the operations of opening and of bending the blank, would there be any difference in the number of bolts so opened and bent in a given time, presuming that you used steam-power in both cases?

Ans. Well, if we should take the same dies that we used to use by hand, and put them in a drop, I think we can knock off as many as we do now with a drop, and less expense at that.

III. The matter of the Fourth and Twelfth exceptions to the Master's Report, contained in the Tenth and Twelfth assignments of error.

If the Master was right, that one of the dies forming the series patented belonged to some other patentee, then clearly the appellees were not entitled to the savings on the *whole*; for what was saved by the bending die did not belong to them, but to some one else, and the burden was on the appellees to separate by evidence the profit due to the use in series over what was saved by the part the master finds belonged to some other patentee. They could not legally leave this to the appellants to do. But the master was wrong not only in the premise, but in the conclusion.

IV. The matter of the Fifth, Eighth, and Thirteenth exceptions to the Master's Report, contained in the Thirteenth, Fourteenth, and Fifteenth assignments of error.

These exceptions bring us back to the original question: Either the appellant's bending die, Exhibit 1 (called by some witnesses a clamp die), will bend the *plain* bolts that were made by appellant, as well and easily as the bending die of the patented series, and is substantially the same as that die, other than not having any grooves or recesses to form wings or flanges, or it is a different thing. If the former, it is a complete answer to the claim for damages; and if the latter, then it is no infringement. At any rate it is what the appellants used for bending their bolts; and although it was argued by the appellees counsel at the original hearing that the appellants used a different bending die, said counsel procured testimony of Earle to support his argument that die No. 1 (though without recesses to form flanges) was substantially like the bending die of the patent, under the construction which they put upon it, viz.: that the language of the reissue specification included such dies with or without grooves and recesses to form such wings or flanges. The position which the counsel and expert afterwards took before the master is wholly inconsistent with the first proposition, though attempt was made to avoid this conclusion (and the Court was deceived thereby) by claiming that Miller's die was U shaped, and Morse die was V shaped, and therefore they were different.

But in any event, Earle admitted that appellant's die was in shape of cavity like the Wilcox die, which was free to be used by any one (see Record, page 87; Ques. and Ans. 322); and if he was right, as he undoubtedly was, and as an inspection of the dies will show, not only did it avoid the Morse patent for this device, but it clearly established the right of appellants and the

public to use it. The appellees' answer, however, was that it was a *hand* tool, but this was immaterial; and that when the sections were closed together in the vise, and it was used as a bender instead of a clamping die,—it was the die of both the Miller and the Morse Patents; this position was equally untenable, for the mere double use of the thing is not invention. Nor were the appellees' expert and counsel right on the other point. The mere *degree* of angle of the grooves for shaping the clip arms did not constitute a substantial difference; and if it did the reissue patent would be void, as there is not a word in the original patent about it. But the record disproves the appellees' assertion, and shows on page 63 of record that in the file and contents of the application for the original Miller patent, the bending die is described in these words: "The die B is a block, with a V-shaped cavity;" not a U-shaped cavity. If that constituted the difference between it and Morse, the reissue description was false, and proven so to be by this record of the application for the original patent

But every one of the three appellees, and every witness who is in the business of making king bolts, uses dies like Exhibit No. 1—as the testimony clearly established—and occupy the position of confessed infringers, under their theory that these dies No. 1 are the dies of the Morse Patent; but they are nothing more than the old dies used by Wilcox, in 1863, put in a steam press, and are free to be used by every one, for any purpose they choose to apply them.

Upon the whole case as presented, both the interlocutory and final decrees entered by the Circuit Court were erroneous, and should be reversed with costs.

O. H. PLATT,
H. T. FENTON,
Counsel for Appellant.

114 b 23

Supreme Court of the United States.

No. 224. OCTOBER TERM, 1884.

THE BEECHER MANUF'G CO., *Appellant*,

vs.

THE ATWATER MANUFACTURING CO.,
JULIUS B. SAVAGE AND ROBERT R. MILLER.

BRIEF FOR APPELLEES.

J. M. WILSON,
GEO. S. PRINDLE,
Counsel for Appellees.

WASHINGTON:
GIBSON BROS., PRINTERS AND BOOKBINDERS.
1885.

Supreme Court of the United States.

THE BEECHER MANUFACTURING COMPANY,
APPELLANT,
vs.
THE ATWATER MANUFACTURING COMPANY, JULIUS B. SAVAGE AND ROBERT R. MILLER,
APPELLEES.

Oct. Term, 1884.
No. 224.

STATEMENT OF THE CASE.

This is an appeal from a decree of the Circuit Court for the District of Connecticut by the Beecher Manufacturing Company for the payment to appellees of $2,100.64 and costs, for the infringement of reissued letters-patent No. 8694, and enjoining perpetually the said Beecher Manufacturing Company from further use of the patented invention.

The bill of complaint charges the appellant with infringement of the said reissued letters-patent No. 8694, issued May 6, 1879, to complainants, assignees, for certain improvements in series of dies for forming the heads of king-bolts, the same having been originally covered by letters-patent No. 100,053, dated Feb'y 22, 1870.

The answer of appellant admitted the manufacture of king-bolts by use of dies and the sale of the same, but denied that they were such as were covered by Miller's patent; that the original patent of Miller did not disclose any patentable invention; that the reissued patent was invalid, for the reason

that it covered an invention not described and claimed in the original patent, and contained new matter, and that Miller was not the original and first inventor of the devices and combinations claimed in his said original and reissued patents.

The case was duly heard, and upon the 21st day of July, 1881, the honorable court filed an opinion sustaining the said reissued patent in so far as the second claim was concerned, but requiring that the first claim of said patent be disclaimed, and upon the 8th day of August, 1881, after such disclaimer had been filed in the U. S. Patent Office, an interlocutory decree was made in favor of appellees, and the matter referred to a master for an accounting.

After due proceedings had before the master, he made his report upon the 3d day of February, 1881, to which report exceptions were taken by both parties, and those of appellee were allowed, while those of appellant were disallowed, and thereupon the final decree issued, as stated.

THE PATENT IN QUESTION.

1st. Upon the 22d day of February, 1870, letters-patent No. 100,053 was issued to Robert R. Miller for an improved series of dies for forming the heads of king-bolts.

2d. The object of the invention covered by this patent was to produce the clip portion or head of a clip king-bolt by means of dies.

3d. Upon the 6th day of May, 1879, the said patent was reissued, No. 8694, and made to cover the dies used for producing the clip portions of a king-bolt, both singly and as a series.

4th. This suit was brought for an infringement of the reissued patent. The validity of said patent is disputed, and such question will hereafter be considered.

INFRINGEMENT.

5th. The appellant denies having infringed the patent, and

the first question which we will consider is whether or not the appellant has used dies, which, if said reissued patent is valid, constitute an infringement.

The evidence on this point is substantially as follows, to wit:

Jarvis, a practical dye sinker, who had worked for appellant for nearly three years, testifies as follows regarding the clip king-bolts made and the dies used by appellant for such purpose during such period, p. 11 of Record:

4th Int. Describe the king bolt which they were making.

Ans. The king bolt that they were making when I left them was what they called a plain king bolt. In form the upper portion was of a V shape, which extended from below the V shape a round shank; on this shank a collar was formed.

5th Int. In what respect did it differ from the flange king bolt which you have referred to as being made in Southington?

Ans. The only difference between the plain king bolt and the one called the flange king bolt—at the base of this V shape there was a protruding or a lip projecting on each side; in all other respects it was identically the same.

6th Int. Which of these bolts had the lip you referred to, the flange or the plain?

Ans. The flange.

7th Int. Were those king bolts which were made by the defendant formed by dies or not?

Ans. They were made by dies.

8th Int. Did you ever, while with the defendant, make any dies for the manufacture of such bolts? If so, describe the dies and the several operations by which they were used.

Ans. While in their employ I made part of these dies for bolts. It wasn't my especial duty to make those special dies altogether. The die is a solid cast iron—the impressions in these dies for the clip were partially cast in, there being no hole in the center. Being a solid die, this hole had to be drilled and reamed, and the impression for the clip sometimes, if this was not of sufficient depth, had to be worked out or made deeper to correspond to the size required. The form of those dies, that they were using when I was there, the upper portion or top, where this impression is sunk, is of a circular form—the bottom or base similar to any other die for holding it in the bed of the drop. In making these king bolt blanks a round piece of iron of a given length is split a certain given

distance from the end or top; this piece of iron that is split is taken and put into these dies, where the impression of the king bolt is made while hot, which is under a drop, and the foundation of this king bolt is made by the drop falling on it. It is taken from this die while still hot and put into a pair of trimmers in the trimming press, which gives it the form required; it is taken from the trimmers and put into what we call the benders, which gives it the form of the letter U or V—more of the V shape, the letter V. When in that state it is called a blank, and then it is reheated and put under dies which draw the shank down, that being large, to the required shape. That completes the operation.

9th Int. Refer to the drawings of complainants' reissued patent "Exhibit A," and state if you find there—and, if so, designate it—any representation of the first blank used in the operation which you have described; I mean the blank first to be subjected to the action of the die.

Ans. Fig. 1 represents the first blank.

10th Int. Referring to the same drawing, do you find there anything showing the shape to which the blank was brought after the operation of the first die, to which you have referred?

Ans. Fig. 2 shows it, with the exception of the depression in the center; in all other respects it is like it.

11th Int. Do you also find there—and, if so, designate it—anything to show the shape to which it was brought by the action of what you call the benders?

Ans. Fig. 3 shows the exact form that it has after coming out of the benders.

12th Int. Referring to the same drawings, do you find anything in them to show the impression of the dies by which the blank was brought into the shape indicated by Fig. 2?

Ans. Fig. 5 in the lower die has the same impression, with the exception of this transverse depression; in all other respects they are identically the same, except this in the drawing is a square die, and the other one was a round die. The upper die was an oblong, flat at each end, having a bulge or projection to correspond with the depression in the lower die. The upper die represented in the drawing has a plain surface; in all other respects they are similar.

13th Int. Look at the model now shown to you, and marked Complainants' Exhibit B and C, and state whether or not it correctly represents the defendant's dies, to which you have referred in your last answer?

Ans. This die represented as "C" is the lower die; the impression in this die is like (objected to as irresponsive) the die proper which they were using, when I was in their employ. Die "B," or upper die, is a perfect *fac-simile* that they were using when I was with them.

14th Int. Referring again to the drawings of the reissued patent, state whether or not you find there anything to illustrate the shape and operation of the dies in use by defendants, and which you have called "benders?"

Ans. Fig. 6 shows an exact representation of their benders.

15th Int. What was the object of the transverse impression in the first mentioned dies, to which you have referred?

A. It was to give it a better shape, and to have it bend easier.

16th Int. How soon after you went into the defendant's employ did you see dies for the manufacture of king bolts, such as you have described?

Ans. They were among the first dies I saw after going there.

17th Int. And did they continue to be used by them while you remained there?

Ans. They did.

Hancock, a practical blacksmith, who had worked for appellant for almost two years, and whose duties included the finishing of the stems or bodies of clip king-bolts after the clips had been forged, testifies as follows regarding the manufacture of clip king-bolts by appellant during the time he was in its employ, p. 18 of Record:

74th Int. During your employment there did they manufacture clip king bolts, and if so, how were the head clips formed?

Ans. They did. Made from round iron; cut in lengths; heated and put under a drop and split to form a clip blank. They were placed in a drop die to form the clip—they called it welding. I believe they were trimmed and bent up, the shanks were drawn then under a hammer.

75th Int. How were they bent up?

Ans. They were placed in a die, in a press, with a hole in it to receive the shank, a plunger came down and bent it.

76th Int. Look at reissued patent, "Complainant's Exhibit A," and state whether you find in its drawings any representa-

tion of a blank before it was subjected to the welding dies, and after it had gone through the welding dies and bending dies, and if so, designate such representations?

Ans. Fig. 1 represents the blank before it went to the welding die. Fig. 2 represents the blank after it went to the welding die and trimming die. Fig. 3 is the nearest of anything here to show the shape of it after it left the bending die.

77th Int. Look at the model, "Exhibit B and C," and state whether that model represents the impressions of the welding dies in use by the defendants during that time, in that manufacture?

Ans. There is a slight difference in the bottom die—no material difference. I believe the corners on the transverse groove were a little sharper than their's—so near as my memory serves. I think the impression for the clip was wider in theirs than in this.

78th Int. Look again at the drawings of Exhibit A, and state whether Fig. 6 represents, with substantial correctness, the bending dies used by the defendant during that time in that manufactory?

Ans. They do.

Atkins, a machinist and die-sinker, who had worked for appellant nearly 17 months, testifies as follows as to the manufacture by it of clip king-bolts during such period, p. 23 of Record:

131st Int. While you were at work, as you have stated, for the defendant, did they manufacture clip king bolts by the use of dies?

Ans. They did.

132d Int. What were the dies called by which the clips of the bolt were formed?

Ans. Welding or forming die.

133d Int. After the blank was subjected to that die, was there any further operation to make the clip; if so, what?

Ans. There was a trimming and bending of it.

134th Int. How was the bending done?

Ans. The bending was done under a press. It was done by the operation of the press.

135th Int. Were there any dies operated by the press?

Ans. There was a former in the press that bent the bolt into shape.

136th Int. Look at the drawings of the reissued patent Exhibit A, and state if the blank which was put into the welding die is represented by any of the figures; and, if so, designate it?

Ans. Fig. 1.

137th Int. Do you find any representation there like the blank, after it was subjected to the welding die, and before subjected to the bending die?

Ans. Fig. 2 there is like it, excepting there is no transverse groove across the center.

138th Int. Is there anything there to show how the blank looked after coming from the bending die?

Ans. Fig. 3 shows that.

139th Int. Look now at Fig. 5 and state whether or not the impressions in the welding dies used by the defendant at that time are like the impressions shown in that figure; if there is any difference point it out?

Ans. There is no transverse groove across the die in Fig. 5, and there is in theirs, and the top die is different by there not being a raise in the center of the die.

140th Int. In other respects were they or not the same?

Ans. In other respects the impression was the same.

141st Int. Look now at Fig. 6 and state whether or not it fairly represents the impression of the bending dies then and there used?

Ans. The impression in the bending die is the same, excepting it is on a different angle. The top die in the drawing is more of a U shape than the defendant's; the bottom die corresponded with the top die.

Beach, a practical blacksmith, who had worked for appellant for several months, preparing the blanks from which kingbolts were made, testifies as follows, p. 26 of Record:

170th Int. Were you ever in the employ of the defendant, Beecher Manufacturing Co., and, if so, during what period?

Ans. I was, in 1879; from the last of July to the 21st of November.

171st Int. While there did you have anything to do with the manufacture of clip king bolts, and if so, what?

Ans. I split them under a drop.

172d Int. Look at patent, "Complainant's Exhibit A," and

state if either of the drawings represent the state of the blank after being so split by you under the drop?

Ans. They do; fig. 1.

173d Int. After the blank was thus formed, what was done with it?

Ans. It was taken to the next drop, put into the fire and welded up.

174th Int. Describe that process of welding.

Ans. Put into the fire and heated to a white heat, it was then put into a hole in the lower die, the upper die coming down and welding up the bolt which was knocked out of the hole with a pin, which you struck with a hand hammer with a lever.

175th Int. What was next done with it?

Ans. It was next put into a trimming die, trimmed and bent.

176th Int. Do you mean bent after being trimmed?

Ans. Yes, sir.

177th Int. How was that done?

Ans. The bending was done by a plunger keyed into the top of the bushen, that went into the press in the bottom die; there was a hole where you picked up the king bolt, put it into this hole, the plunger coming down strikes it, bends the bolt up.

178th Int. What is next done with it?

Ans. It went to the hammer and was necked; shank drawed on it, it then went to the clamping dies, from the clamping dies it went on to another hammer and was water finished.

179th Int. Now please describe more particularly the first set of dies which you call welding dies, and to do so you may refer to the models B and C.

Ans. These models are about as near as you could get them, with the exception that the clip is wider close to the hole in the defendant's die than in the models, in proportion.

180th Int. Referring to the model, what is the object in the die of the transverse impressions as shown by the model?

(Objected to, for the reason that it has not been shown that the witness has ever used any of the dies similar to the model, and is not called on as an expert.)

Ans. It is to strike the clip trimmer in the king bolt at that point.

181st Int. Did it serve any other purpose?

(Same objection.)

Ans. No; only it made the king bolt wider there.

182d Int. Didn't it assist in the bending?

Ans. Yes; you could get them into the trimming dies of your press easier.

183d Int. Look at the drawing, fig. 5, in re-issued patent, Exhibit A, and state how the blank turned out the die there represented would differ, if at all, from the blank turned out of dies made like the model?

(Same objection, and for the further reason that it has not been shown that the witness used any of the dies shown in Fig. 5 of the patent.)

Ans. I don't think that they would differ at all.

184th Int. What opportunities had you for seeing the operation of these welding dies in defendant's works?

Ans. Because I ran the next drop to where the work was done.

185th Int. How near was your drop to that?

Ans. Probably was six to eight feet.

186th Int. Did you ever have occasion to use that drop with the welding dies yourself?

Ans. No, sir.

187th Int. Did you ever operate the dies?

Ans. No further than splitting them.

188th Int. Have you operated welding dies of this sort?

Ans. Well, not exactly the same sort.

189th Int. Now describe the impression and operation of the bending dies used there, and for that purpose you may refer to fig. 6 of the patent?

(Objected to, as leading.)

Ans. It is as near like it as anything I ever saw.

190th Int. What were your opportunities for seeing those dies and their operation?

Ans. A great many times, when I was blowing up a fire I would stand by the side of the drop and press in which the bolt was made.

191st Int. And observed its operation, do you mean?

A. Yes, sir.

192d Int. You have spoken of a set of clamping dies; what were they and what did they do?

Ans. They clamped the clip to the king bolt. The bolt was put in between a pair of dies, the front die being shoved up to the back one with a lever, the plunger coming down striking the king bolt, formed it, making the clip smoother.

193d Int. Were all these dies that you have described used by the defendants, as you have described, during the entire time you were with them?

Ans. They were.

In addition to this, the record shows that while appellant was denying the use of appliances which constituted an infringement, it declined to give information as to what it really did use.

Upon p. 48 of Record, in the testimony of Southwick, secretary of the Beecher Manufacturing Co., appellant, appears the following, viz:

X Ques. 21. Will you please produce, before the testimony is closed on the part of the defendant, the set or series of the dies which you have just described as being used in the manufacture of bolts like Exhibit 10?

(Mr. Fenton, counsel for the respondent, instructs the witness to decline to produce such a set, for the reason that the process of manufacture of this character of goods is a trade secret in each and every establishment that manufactures the bolts and that class of goods; and for the additional reason that the witness has plainly, distinctly, and unqualifiedly stated that the defendants do not and have not at any time used any dies substantially similar in whole or in part, as respects the forms patented, to the dies shown and described and claimed in the reissue letters patent in suit.)

Ans. 21. Under instructions of counsel, I decline to do so.

X Ques. 22. Is there anything in your process of making king bolts that you have not already in your testimony described?

Ans. 22. I think not, sir.

X Ques. 23. Will you permit an expert on the part of the complainant to examine in your factory the dies and their operation, to which you have testified as in use by the defendant in the manufacture of such king bolts as Exhibit 10?

(Mr. Fenton objects to the question and to the request, for the reasons assigned to the previous question, and instructs the witness to decline.)

Ans. 23. Under the instruction of counsel, I decline.

Upon p. 52 of Record, in the testimony of McElney, one of appellant's witnesses, appears the following, viz:

X Ques. 31. Do you mean to be understood that the Beecher Company, during your connection with them, have at no time used in the manufacture of king bolts any other dies than those they now use?

Ans. 31. They have not.

X Ques. 32. Do you mean to be understood that during this period the only dies which they have used in the manufacture of king bolts are the three sets of dies represented by the respective drawings, Exhibits 1, 13, and 14?

Ans. 32. No, sir; they are not.

X Ques. 33. Will you please have made and present drawings of such other dies as they have so used?

(Objected to, because improper to put upon witness the trouble and expense of preparing drawings of other two dies, to wit, trimming and finishing dies, which have no connection with this case.)

Ans. 33. Mr. Fenton has drawings of the trimming and finishing dies.

It is, therefore, plain that there was an infringement, and the next question is, was the patent thus infringed a valid patent? and we will consider the same while answering the appellant's assignment of errors, in which the point is made.

FIRST ASSIGNMENT.

The point made in this assignment of error is that the series of dies claimed by Miller is not a patentable combination, and that separately the dies were old and well known.

To this we answer that it is not true that the dies, separately or in pairs, were old and well known at the time of the issue of Miller's original patent, and there is nothing in the record to support such averment.

The dies covered by Miller's claim were patentable as a series, and their operation is clearly within the decision in Forbush *vs.* Cook, 2d Fisher, p. 668, in which it was held:

"To make a valid claim for a combination it is not necessary that the several elementary parts of the combination should act simultaneously.

"If these elementary parts are so arranged that the successive action of each contributes to produce some one practical result, which result, when obtained, is the product of the simultaneous or successive action of all of the elementary parts viewed as an entire whole, a valid claim for thus combining these elementary parts may be made.

"Nor is it required to include in the claim for a combination as elements thereof all parts of a machine which are necessary to its action, save as they may be understood as entering into the mode of combining and arranging the elements of the combination."

In Bridsell *vs.* McDonald (1 Banning and Arden, p. 165) the court held as follows:

"A combination is legitimate when all of the elements cooperate in producing a result and are necessary to it, though their several functions are not performed simultaneously, but in immediate succession."

The same ground is covered in many other cases, among which are cited the following, viz:

Henning *vs.* Nelson, 3 Banning and Arden, p. 55.
Hoe *vs.* Cottrell, 5 Banning and Arden. p. 256.
Williams *vs.* R.R. Co., 15 O. G., p. 653.

In the last-named case the court used substantially the following language:

"The doctrine as to non-patentable aggregations announced in Hailes *vs.* Van Wormer and Rickendofer *vs.* Taber does not apply when all the elements brought together contribute and co-operate in the production of an improved result due to their combination."

The Miller dies take a rough, forked piece of iron, and by successive steps cause the same to assume the form of a clip king-bolt. The blank, after having passed through the first

pair of dies, has no utility and could never become an article of merchandise, but after having been subjected to the action of the second pair of dies is, in so far as the clip portion is concerned, ready to be placed upon the market. The first pair of dies change the shape of the blank in the direction of the finished clip, while the second pair of dies by a farther change in shape complete such clip. Neither performs the entire work, but the finished clip is the result of their joint contributions.

It is useless to speculate with regard to what might have been done if the bending dies had been used twice—once as welding dies and again as bending dies—for the reason that the evidence is conclusive that appellant did not thus make clip-king-bolts, but did use both pairs of the Miller dies in their construction, and that therefore the point sought to be made as to the inutility of the Miller welding dies is only an effort to escape the legitimate result of the unwarranted use of property which belonged to others, and to which appellant had not the shadow of a claim.

SECOND ASSIGNMENT.

The only point made in this assignment of error not included in the first assignment, just discussed, is that the pairs of dies are not used in sequence, because intermediate trimming dies are used between them.

To this we answer that the use of the trimming dies in no manner modifies or changes the operations of the welding and bending dies, the only purpose served by said trimming dies being the removal from the edges of the clip of a thin film of metal which represents the surplus stock that is pressed laterally outward between the dies, and which would in nowise interfere with the operation of the bending dies if not removed before the forging from the welding dies was placed therein.

Jarvis, p. 17:

63d Rd. Int. What was the trimming operation?

Ans. After the bolt is taken from the welding dies, Fig. 5, it has a ragged outside edge, and by passing through the trimming dies the required form is obtained.

64th Rd. Int. Do you mean any other form than results from trimming the ragged edge off?

Ans. No, sir.

Southwick, p. 49:

X Ques. 9. Then they are trimmed, are they?

Ans. 9. Yes, sir.

X Ques. 10. Is the shape at all affected by that operation?

Ans. 10. Yes, sir.

X Ques. 11. In what way?

Ans. 11. It takes off the surplus stock; what we call the wings or flanges. It is uneven, and we have to trim it.

X Ques. 12. That is the only effect?

Ans. 12. Yes, sir; I think so.

The fin which is removed by the trimming dies might be removed by any desired means other than the trimming dies, as, for instance, by a file; but, however removed, or at whatever period during the formation of the clip, as its presence or absence can in nowise affect the operation of the bending dies, there is no interruption of the sequence of dies claimed by the use of trimming dies, nor is such series incomplete if said trimming dies are omitted entirely.

In support of these views, we cite the case of Forbush *v.* Cook, 2d Fisher, p. 668, in which it was held as follows, viz:

"Nor is it required to include in the claim for a combination as elements thereof all parts of a machine which are necessary to its action, save as they may be understood as entering into the mode of combining and arranging the elements of the combination."

THIRD ASSIGNMENT.

The point made in this assignment of error is that dies were, generically, old, and as clip king-bolts were old prior to the construction of Miller's dies, there was no patentable invention described or claimed in the reissued patent in question.

To this we answer that neither of the dies shown in Miller's patent were known or used before his invention of the same, but even though one of said dies had been old, as they operate as a series, and by successive steps carry a blank from a rude form to a finished form, they were, so combined, patentable.

Gallahue *v.* Butterfield, 10 Blatchford, 232; 6 Fisher, 203; 2 O. G. 645.

The novelty of the *product* has no bearing in this case, as the series of dies for producing the article, and not the article itself, is claimed.

American Wood Paper Co. *v.* Fibre Disintegrating Co., 23 Wall., 566.

Rubber Co. *v.* Goodyear, 2 Fish., 499; 9 Wall., 788; 2 Cliff., 351.

FOURTH ASSIGNMENT.

In the fourth assignment of error the point is made that no infringement was proved, because appellants never used bending dies like those of Miller's patent.

To this we answer that the infringement was clearly proven by the evidence of Jarvis, (p. 11, ints. 4 to 17,) in which is shown the use of Miller's welding dies B and C, and his binding dies D and E; by the evidence of Hancock, (p. 18, ints. 74 to 78;) Atkins, (p. 23, ints. 136 to 141;) Beach, (p. 27, ints. 172 to 193.)

FIFTH ASSIGNMENT.

The point made in this assignment of error is that the reissued patent covered only dies adapted to form king-bolts having wide wings or flanges.

To this we answer that the operation of the dies is the same in principle in forming either kind of bolt, the differences between the plain and flanged bolts being only in the width of the head of the clip, and dies which would form one kind would form the other, for which purpose it is only necessary

that sufficient stock be provided and the trimming dies adapted to give the required shape to the head of the clip. (Jarvis, ints. 26 to 32; Beach, ints. 195 to 196; Webster, 243 to 247; Miller, 269 to 270.)

SIXTH ASSIGNMENT.

The points herein made are that the combination claimed in Miller's patent was anticipated by the prior patent of Morse and prior use by Wilcox.

To the first of these points we answer that Miller's application for patent was filed upon the 31st day of July, 1869, and upon the 9th day of October, 1869, was placed in interference with an application of Morse, which was filed Sept. 25th, 1869.

Upon the 25th day of September, 1869, Morse filed another application for patent, and upon the same, while Miller's case was in interference, the Morse patent referred to, No. 96251, was issued October 26th, 1869. As Miller's record date is earlier than that of Morse, the said patent of the latter is worthless as evidence of anticipation.

To the second point I answer that Wilcox never used dies like those claimed by Miller, nor, in fact, did he use any dies for the manufacture of clip king-bolts until after the issue of Miller's patent, February 22, 1870.

The Wilcoxs, father and sons, were called by appellant to prove the use of dies substantially like those patented to Miller. Geo. E. Wilcox testifies as follows concerning the alleged dies used by them, (p. 38:)

Ques. 10. Will you please state the exact operation of the several dies used at your father's place at Portchester for the manufacture of king bolts between the years 1863 and 1868?

Ans. 10. We first took iron 7-8 square and split it like Exhibit No. 9, only it was square instead of round; then, after it was split, we put in these dies, Nos. 7 and 8, and drove it down, and smoothed it with a die rounding on the top, to fit on the top of the king bolt.

Ques. 11. Was the piece of metal, Exhibit No. 9, submitted

to any other action prior to being put in the die Nos. 7 and 8?

Ans. 11. No, sir.

Ques. 12. Now, after it went through the operation of the die 7 and 8, with the upper die, what else did you do with the unfinished bolt?

Ans. 12. We merely swedged the clips on an anvil to round them.

Ques. 13. Prior to inserting the bolt in the dies 7 and 8, did you strike down the clips?

Ans. 13. No, sir; it was upset first.

Ques. 14. What do you mean by "upset"?

Ans. 14. Make it a little wider in the bearings of the clips.

Ques. 15. How did you make it a little wider in the bearings?

Ans. 15. By having a top die around it.

Ques. 16. Was that done prior to subjecting the bolt to the operation of the die 7 and 8?

Ans. 16. At the same time; that is what it was put in the die 7 and 8 for.

Ques. 17. Did, or did not, the die 7 and 8 answer the double purpose of bending the clips and forming the bolts?

Ans. 17. They did; we left it as it came out of those dies, the clip part; we merely rounded the clip arms, and then put it back again in the same die to smooth it up, and left it as those dies left it.

Sam'l K. Wilcox testifies as follows upon the same point, (p. 41:)

Ques. 7. Please look at the dies Exhibits 6, 7, and 8, and state if you recognize them, or any of them, as having been used at the foundry of Josiah Wilcox?

Ans. 7. I do recognize them all.

Ques. 8. Do you recollect whether or not they were used in the forming and bending of king bolts at his place, and during what years were they so used, as near as you can remember?

Ans. 8. Well, I could not state the years; I remember they used them during the war.

Ques. 9. Please state whether or not in the manufacture of king bolts prior to 1868, at Mr. Wilcox's place, there was any fuller or upper die used in connection with the dies 7 and 8.

Ans. 9. There was a fuller.

Ques. 10. And what was its purpose?

Ans. 10. For upsetting and spreading the stock of the bolt at the base of the clips.

Ques. 11. What do you mean by upset?

Ans. 11. Running the stock down on to the die Exhibits 7 and 8.

Ques. 12. State whether or not the king bolt was both bent and formed by the dies 7 and 8 at Mr. Wilcox's place?

Ans. 12. They were.

Ques. 13. Prior to being put through the dies 7 and 8, state whether or not the unfinished bolt was subjected to any operation by dies or hammer or otherwise?

Ans. 13. It was not, except hammered a little, and then split with a chisel. It was a piece of square iron, and then drawn a little on the end, split with a chisel, and upset in this die, Exhibit 7.

Ques. 14. Please state whether or not the bolt was subjected to any further operation by dies, or otherwise, after it came out of the dies 7 and 8?

Ans. 14. The king bolt was put on the corner of the anvil; a swedge was used on the clips of the king bolt for rounding and smoothing the clips, also to spread the clips.

Burns testifies as follows concerning the use of the alleged dies of Wilcox, (p. 71:)

214th Int. Now describe the process you employed with these tools, in your manufacture of clip king bolts, after 1863, at Mr. Wilcox's in Portchester, N. Y.

Ans. After 1863, the bolt and collar was formed under the trip hammer. The object of the vise was this—the vise opened and shut to receive the bolt; the clip part of the bolt was split by a hand chisel or a blacksmith's chisel, and placed in the foot vise, and the fork or crotch of the bolt was formed with a common blacksmith's fuller. The clip part of the bolt was formed by placing it on the corner of the anvil, and swedged to its proper shape with a swedge made for the purpose, struck on with a sledge by hand.

215th Int. Did the foot vise and fuller serve any other purpose than to shape the crotch or yoke of the bolt?

Ans. The foot vise was so constructed as to form a proper shape to the crotch of the bolt. That was all the purpose it served. The clip was formed on the anvil by the swedge.

In 1870, after the Miller dies had been patented, Wilcox adopted such dies, as is shown by the testimony of Burns, (p. 72:)

216th Int. For how long after 1863 was the process which you have last described used at Wilcox's in their manufacture of clip king bolts?

Ans. I think it was used for eight or nine years.

217th Int. During what years did you work at the Wilcox factory in Portchester; I mean the factory of Josiah Wilcox?

Ans. I was employed there in the neighborhood of thirty years, commencing about thirty-five years ago.

218th Int. Did Josiah Wilcox at any time thereafter make any clip king bolts by any other process than such as you have last described; and, if so, when did he commence such manufacture, and describe it?

Ans. He did, in October, 1870. He changed the process from the foot vise to a solid die placed under a drop, for the purpose of forcing the crotch, or fork, and clip of the bolt at once, or in one process.

219th Int. And by what process were the clips bent into proper shape after being formed by the dies you have mentioned?

Ans. They was placed into a solid die, made or shaped to give the bolt a proper shape to go on the axle of a wagon. There were two dies, an upper and a lower, to give it the proper shape.

220th Int. Are you able in any way, other than your present recollection, to fix the time as October, 1870, when Mr. Wilcox commenced making dies by this last described process?

Ans. I am. My record on my books, where he gave me credit for the amount in making the bolts. I had the contract for making them.

Upon this point Josiah Wilcox testifies as follows, (p. 35:)

X Ques. 1. Are you familiar with the dies patented to this concern by the patents on which this suit is brought?

Ans. 1. Yes, sir.

X Ques. 2. Have you ever used in your manufacture of king bolts such dies, or any of them?

Ans. 2. Such as what?

X Ques. 3. The Miller.

Ans. 3. I used the solid die after I got the drop. I used the solid die first, then went to the drop, and then set them with the sold die; finished them in the open die, like this (Exhibit 8.)

X Ques. 4. Do you mean to say you regard these dies which you have put in evidence this morning as being the same in construction with the dies patented to Miller?

Ans. 4. The same, only one was in a drop, and the other by foot; the principle is the same—the idea.

X Ques. 5. When did you commence using the drop?

Ans. 5. About 1870; 1869 or 1870.

X Ques. 5½. Since you commenced using the drop have you varied the construction of your dies?

Ans. 5½. We make improvements all the time—from year to year.

X Ques. 6. Have you, in fact, made improvements in the construction of these dies from year to year since 1870?

Ans. 6. No; we were only making the bolt wider.

Geo. E. Wilcox admits infringement of Miller's dies in a letter of May 24, 1880, written for his father, (p. 90,) and in his testimony fixes the date when they ceased the use of hand tools, (p. 37:)

Ques. 9. For how many years, and during what years, did you use dies 6, 7, and 8?

Ans. 9. No. 6 we did not use any longer than 1862; No. 7 we used 1862 and 1863; and No. 8 about 1863; we used No. 8 from 1863 to 1869 or 1870; we got a new drop in 1870.

SEVENTH ASSIGNMENT.

The point herein made is the invalidity of Miller's reissued patent because of new matter contained therein which was unwarranted by the original patent.

To this we answer that the claim of the reissued patent is almost identical in form with that of Miller's original patent and is in no manner expanded. On the contrary, if any difference exists between said claims, the new claim is more limited than the original claim, for the reason that it specifically embraces the plain-faced upper die or drop, while in said origi-

nal claim such part was not named and only included by implication.

While Miller's application of July 31st, 1869, was pending, an interference was declared between the same, and an application of Morse filed Sept. 25th, 1869. After some testimony had been taken by each party the attorneys agreed to amend their cases out of interference, and under such agreement a disclaimer was filed by Miller's attorney. Under the very loose practice which then prevailed in the Patent Office the interference was then dissolved by mutual consent, without any award of priority to either applicant, and upon the same day, Feb'y 22d, 1870, patents were issued to each applicant.

The disclaimer filed in Miller's name was unnecessary and irrelevant, and not what was properly required in order to relieve the applications from interference, and the result left each applicant in precisely the position he before occupied, priority of invention being with Miller in consequence of his earlier record date. The irrelevancy of the disclaimer was recognized by the Patent Office when, upon the 11th day of April, 1879, the same examiner who had allowed the original application of Miller allowed his reissue application with a claim covering the subject-matter before disclaimed, and upon such allowed reissue application Miller's reissued patent in question was issued. Under the ruling of the honorable judge of the lower court the said reinstated claim was formally disclaimed, which left the scope of the reissued patent precisely the same as that of the original patent.

In Miller's original patent it is stated that the prepared blank is "placed in the die (A) and struck by a drop." The drop referred to is well known to every person familiar with forging of metal to be a machine for operating forging dies, in which there is a sliding weight that is alternately raised by power and then permitted to fall. Any form of die may be secured within the bed of the machine, and to the lower end of the said weight is secured another die, either plain-faced or otherwise, after which the metal to be operated upon is placed upon

the lower die and by one or more blows from the upper die is made to conform to and fill the recesses of said lower die.

An upper die was a necessity to the operation of Miller's lower die, ("A,") and as everything in the drawings and specifications of his original patent showed that such upper die was plain-faced, there could have been no impropriety in specifically claiming in the reissue what was so clearly shown in said original patent, more especially when the insertion of said element in the claim in no manner broadened the same. If the original claim was valid when it included by implication the absolutely essential upper die, then the reissued claim cannot be invalid, because it specifically names such die.

The drawings of the reissued patent show identically the same dies as do those of the original patent, and the description of said dies and of their operation is in substance the same in each. There is nothing in the requirements of the law, as interpreted by the courts, which compels an inventer when reissuing a patent to use the same language in describing his invention and to employ the same figures in his drawings as appear in his original patent; and if in the reissued patent the invention is more plainly and clearly described and its construction better shown in the drawings—as is true in this instance—such changes as have tended to produce this result are not the proper subject for captious criticisms, but are meritorious and bring the case clearly within a recent decision of this court, in which it was stated that "the specification may be amended so as to make it more clear and distinct. The claim may be modified so as to make it more conformable to the exact rights of the patentee, but the invention must be the same."

A careful examination of the specifications of the original and the reissued patents will show that while the phraseology employed is somewhat different their scope is the same.

EIGHTH ASSIGNMENT.

The point herein made is that the reissued patent covers

matter which was not originally claimed, and which, therefore, has been lost or abandoned by over nine years' neglect to apply for a reissue.

To this we answer that the reissued patent, since the filing of the disclaimer to the first claim, covers nothing more than did the original patent, and that, therefore, there has been no laches upon part of the patentees.

NINTH ASSIGNMENT.

The point made herein is, that the opening clause of the reissue specification contains an admission that the sole object of the reissue was to redescribe the alleged invention, and to enlarge the claim of the original patent.

To this we answer that no such admission is found in the specification of the reissued patent. There is the statement that the "letters-patent have been found defective, in that the specification and claims do not cover all of the invention shown and described in the application filed upon the 31st day of July, 1869," but we deny that such statement constitutes an admission that the sole object of such reissue was for the purpose alleged. The reissue in question was made under a practice which then and for many years had prevailed, and had been sustained by the courts, and was not only in conformity with such practice, but, aside from the resumption by claim of matter which had before been disclaimed, said reissued patent was in all respects unobjectionable to the practice which now prevails.

Seymour *vs.* Osborn, 11 Wall., 516.

Marsh *vs.* Seymour, 7 Otto, 348.

TENTH ASSIGNMENT.

The points herein made are that the master improperly based his award upon the difference in cost between hand-made kingbolts and those made by the patented dies, and ignored the alleged fact that the same result could be secured by using

the bending dies twice, instead of the swaging and bending dies.

To the first of these points we answer that such award was correct, for the reason that no other means than hand work for constructing king-bolts was open to appellant, and that as it used the identical dies patented to appellee, and in the identical manner covered by the patent in question, the true measure of damages was the difference in cost between the articles when made by hand and when made by the patented dies.

To the second point we answer that it does not appear that appellant ever used the bending dies both as welding and bending dies, or that such double use would have been successful, or that the bending dies thus used were open to appellant, and that, therefore, it would have been absurd for the master to have entertained such an assumption and to have permitted the same to have influenced his action.

ELEVENTH ASSIGNMENT.

The point herein made is that the master erred in charging appellants the whole difference in cost between forming and bending the bolt by hand and forming and bending by appellee's dies, because in the same sentence he found that one of the dies of the series was patented to Morse Feb'y 22d, 1870.

To this we answer that the language used by the master with regard to the Morse patent was only for the purpose of answering the assumption of appellant that the bending dies were open to use as both welding and bending dies. There had been no evidence as to the validity or scope of the Morse patent, and the master's reference to the same was evidently for the purpose named. As, however, there was no evidence to show that appellants ever made such use of the bending dies, the master's award was not and could not be governed by the assumption that they could be so used.

TWELFTH ASSIGNMENT.

The points herein made are that the master erred in report-

ing more than nominal damages against appellant, because that nothing was saved or gained by the use of the series of dies, but that the bending die of appellee's patent could alone have been used to perform the whole work of forming and binding, and that such die was open to the public.

To the first of these points we answer that the best evidence as to the advantage of the *series* of dies in the forming of king-bolts was furnished by their continued use by appellant previous to the commencement of this suit.

The position assumed by it *after* suit had been brought, that the welding dies were superfluous, and that their use resulted in no gain or saving, is rather farfetched.

To the second point we answer that the bending die was not open to the public, and therefore could not have been used by appellant for the forming of clip king-bolts.

THIRTEENTH ASSIGNMENT.

The point herein made is that the master erred in reporting that the partial steps which would be taken if either of the appellee's dies was adopted as the most valuable part of another series for making the same article would be covered by Morse's patent of February 22, 1870, as, under such ruling, the profits would belong to Morse, and not to appellee.

To this we answer that the statement of the master was intended to meet the assumption of appellant that the bending dies alone were necessary for the forming of king-bolts, and that such dies were open to the public. As appellant did not so use the bending dies, and as it did use the Miller series of dies, the question of damage can in no way be affected by such hypothetical case.

FOURTEENTH ASSIGNMENT.

The point herein made is that the master erred in reporting that appellant's clamp die was not available to it, either when used to form or bend the arms of clip king-bolts or to do both

of said steps in one act, as such use would be in infringement of Morse's patent of Feb'y 22, 1870, if not that of Miller.

To this we answer that the statement of the master was in answer to the assumption by appellant that it had the right to use such dies for both forming and bending; that nothing was gained by the use of the Miller series of dies, and that, therefore, appellee was not entitled to any but nominal damages. The finding of the master in this instance was in effect only a denial of the claim of appellant that other means than hand-work was open to it for the forming of king-bolts.

FIFTEENTH ASSIGNMENT.

The point herein made is that the master erred in finding and reporting that the bending die alone, as described and shown in appellee's patent at Fig. 6, is covered by the Morse patent, and therefore not free to be used by the defendant and the public.

To this we answer that the finding of the master in the particular named related to the claim of appellant; that the bending die of itself was public property, and therefore free to be used by any, and was intended as an answer to such assumption and for no other purpose.

SIXTEENTH ASSIGNMENT.

The point herein made is that the master erred in not reporting that appellant was at liberty to use the clamp-dies, Exhibit No. 1, as described in the testimony.

To this we answer that the point named constituted one of the defenses which appellant sought to establish both by testimony and in its argument before the court below; that the question properly belonged to and was settled by the said court in its interlocutory decree, and that the master was not authorized to make the report desired by appellant. Moreover, the master could not have justly made the report named for the reason that the weight of evidence was overwhelmingly against such conclusion.

The point herein made is that the master erred in comparing the daily product of appellant's dies, operated by machinery, with the Wilcox dies, operated in a foot vise, and making up an account accordingly on the basis of an increased daily product.

To this we answer that Wilcox used no dies for making clip king-bolts previous to his adoption of the Miller dies in 1870; that the so-called Wilcox dies were simply clamps which held the body of the bolt blank while the head of the clip was upset and roughly shaped out by means of a fuller, (Burns, p. 71, ints. 210 to 215,) and that he adopted the Miller dies within the year in which they were patented, (Burns, p. 72, ints. 218 to 220,) and used the same up to May 24, 1880, at which time he admitted infringement and wished to make arrangements with the owners of the patent, (p. 90, Exhibit D.)

The rude hand tools of Wilcox were only adapted for hand work, and the product was poor in quality and finish. With the Miller dies, three times the number of bolts per man were made each day, and the quality and finish of the same were such as to give to the die-made bolts one-third greater value in the market than the value of the hand-made bolts. (Burns, p. 72, ints. 222 to 225; Webster, p. 75, ints. 248, 249; Smith, p. 105, ints. 4 to 14; Miller, p. 112, ints. 7 to 11 and 22, 23; Savage, p. 115, ints. 1, 2; p. 118, ints. 10 to 15.)

The master did not err in comparing the daily product of the Wilcox hand tools with the daily product of Miller's dies, and making up his account upon the basis of an increased daily product, for the reason that the hand tools of Wilcox were the best obtainable means for forming clip king bolts previous to the invention of Miller's dies, and that the increased product was due wholly to the of said invention.

There is no evidence that the Wilcox clamps, which appellant calls dies, were ever operated by machinery, and, there-